AUGUST 31, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

What's Wrong with Job Shops?

Nothing that sound management can't solve. But one area where the smaller shops have particular difficulties is in managerial depth. They often can't afford enough managers, so the boss wears too many hats. Most other job shop problems—price fighting, finances, research—will have a familiar ring to any businessman. To learn how the little company is making out, see Page 42.

Steel Industry Makes New Appeal to Union for Sensible Strike Solution

Keeping Supervisors Happy, Nonunion

Outlook Is Bright for Seven Types Of Cleaning and Finishing Equipment

U. S. Plans More Materials Research

Family of Spark Machines Is Here

Extrusions Help to Hold Cost Line

COMPLETE CONTENTS
TURN PAGE

METALWORKING OUTLOOK
PAGE 19

NEW EC&M GIVES YOU VERTICAL MASTER SWITCH REAL FLEXIBILITY!

Built-in Features Make Type VM Best for Many Jobs

MANY FORMS AVAILABLE • Supplied for either right- or left-hand operation—in four sizes to accommodate maximums of 6, 9, 12, and 16 circuits—with or without enclosure.

WIDE VARIETY OF APPLICATIONS • Small size makes it a "natural" for jobs where space is limited—can be mounted adjacent to operator's chair—ideal for air-conditioned crane cabs—for ore bridge installations—for any desk-mounted application.

SUPERIOR DESIGN FEATURES • Narrow width and short throw reduce operator fatigue—mill-type construction throughout—optional features include spring return to OFF point, pushbutton contact in handle. Offers all of the fine construction features of the well-known EC&M cam master switch.

Write for Bulletin 9004 VM

TYPE CM MASTER SWITCH

• This service-proven EC&M cam master switch is designed for surface-mounting on all mill, crane, and hoist applications. Narrow width permits close grouping of several master switches within easy reach of the operator.

FOR BASIC STEEL MAKING, IT'S EC&M CONTROL

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 • OHIO

9813

This Week in STEEL

The Metalworking Weekly

August 31, 1959 Vol. 145—No. 9

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED AUG. 22	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	109†	114	121	135

†Preliminary.

In the last four weeks, auto model changeover operations have resulted in a 12 point decline in the industrial production index. Electric output has been stable at a high level, while steel operations and freight carloadings have held steady at low levels.

Details on Page 49

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED AUG. 29	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled ..... (Source: Ward's Automotive Reports.)	20,000*	32,948†	122,518	16,771

*Estimated. †Preliminary.

By the end of last week, Chevrolet and Ford had completed their '59 model runs. While the buildup won't be great for another two weeks, the trend at least will be in the right direction starting this week.

Details on Page 46

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED AUG. 30	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	340*	321	345	1,715
Index (1947-49=100)	21.2*	20.0	21.5	106.8
Percentage of capacity	12.0*	11.3	12.2	63.5

*Estimated by STEEL; comparative figures reported by AISI.

Production of steel ingots by mills unaffected by the strike continues to fluctuate narrowly between 11 and 13 per cent of capacity. Ingot tons lost by the strike through Aug. 31 total 13,588,800 tons.

Details on Page 90

STEEL SCRAP PRICE COMPOSITE

	AUG. 26	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$38.33	$38.33	$38.67	$41.67

For the fourth consecutive week STEEL's composite on No. 1 heavy melting steel holds unchanged. Lack of heavy buying by domestic mills is counteracted by active export demand and prospects for an active post-strike period.

Details on Page 102

FINISHED STEEL PRICE INDEX

	AUG. 25	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.7	186.7	186.7	186.5

Prices for foreign produced steel are moving upward and are approaching domestic mill quotations on more products. As supplies tighten on the prolongation of the strike, interest in metal from abroad mounts.

Details on Page 91

KNOW YOUR ALLOY STEELS . . .
This is the second of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Effects of Elements Used in Alloy Steels

To simplify a rather complex subject, let's outline some of the individual effects of four leading alloying elements used in alloy steels:

Nickel—One of the fundamental alloying elements, nickel provides such properties as deep hardening, improved toughness at low temperatures, low distortion in quenching certain types of tool steels, good resistance to corrosion when used in conjunction with chromium in stainless grades, and ready response to economical methods of heat-treating.

Chromium—This element is used extensively to increase the corrosion-resistance of steel. It also improves the surface resistance to abrasion and wear. It exerts a toughening effect and increases the hardenability.

Molybdenum—This element exerts a strong effect on the hardenability and toughness of steel. It greatly increases short-time and long-time strength at high temperatures.

Vanadium—An element used to refine the grain and enhance the mechanical properties of steel.

A combination of two or more of the above alloying elements usually imparts some of the characteristic properties of each. For example, chromium-nickel grades of steel develop good hardening properties with excellent ductility. And chromium-molybdenum steels develop excellent hardenability with satisfactory ductility and a certain amount of heat-resistance. In other words, the total effect of a combination of alloying elements is usually greater than the sum of their individual effects. This interrelation must be taken into account whenever a change in a specified analysis is evaluated.

Bethlehem metallurgists can be of considerable help to you in selecting the proper alloy steel for any use. These men will gladly give unbiased advice on alloy steel analysis, heat-treatment, machinability, and expected results. Feel free to call upon them at any time.

And please remember, too, that Bethlehem manufactures all AISI standard alloy steels, as well as special-analysis steels and the full range of carbon grades. You can rely upon their quality, always.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

What qualities should a "production" bearing have?

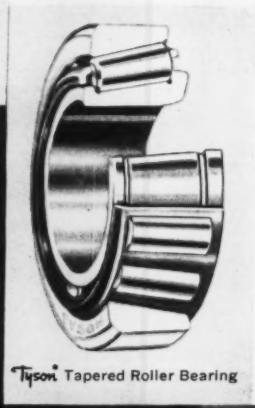
Take a single-row deep-groove bearing, for example.

As SKF makes it, the type shown here sustains heavy radial load—as well as thrust load in either direction—it can be used at normal speeds with grease lubrication or at high speeds with oil. *Yet it is a standard SKF bearing.*

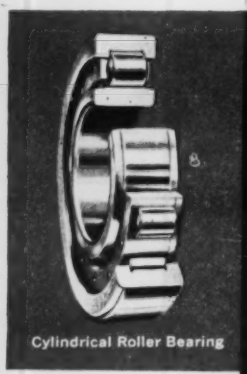
We even mass-produce some sizes of this particular bearing at our automated Altoona (Pa.) plant. You can buy quickly and economically. There are over 100 sizes ranging from over 5/8" O.D. to almost 16" O.D., with various seal, shield and snap-ring combinations.

But why not compare the quality, availability and price of this SKF bearing (or any of the other SKF products) with those you now use? For details, just call any of the 25 SKF sales offices. 5916

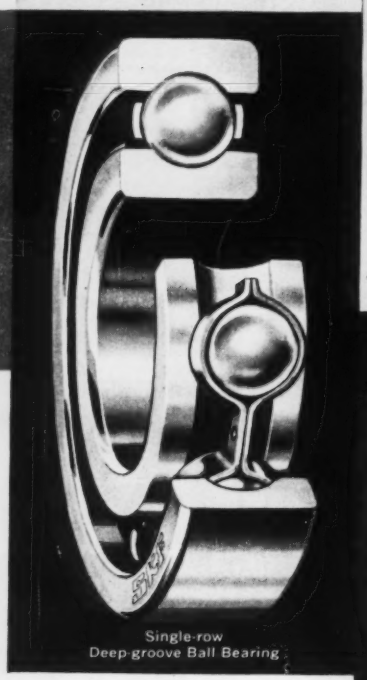
Spherical Roller Bearing



Tyson Tapered Roller Bearing



Cylindrical Roller Bearing



Single-row Deep-groove Ball Bearing

Angular Contact Bearing

Spherical Roller Thrust Bearing

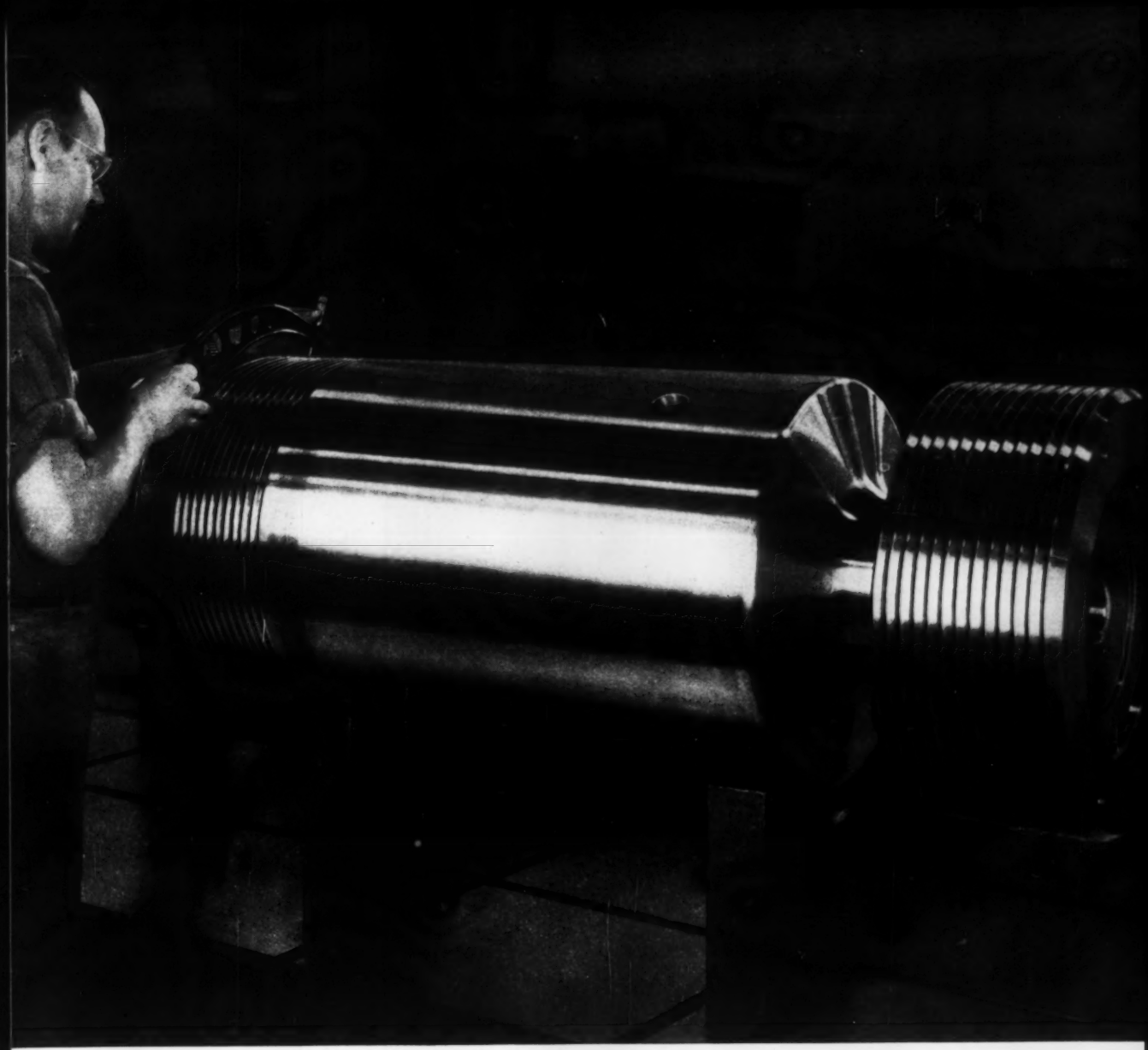
Spherical, Cylindrical, Ball, and Tyson Tapered Roller Bearings

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

® REG. U. S. PAT. OFF.



WHO FORGES THE TOUGH ONES?...
and precision-machines them, too?

When the forgings come as tough as this motor housing, the customers come to National Forge. On this job (for a chemical manufacturer), we had to forge and precision-machine to extremely close dimensional tolerances (+.0020″, −.0002″ including run-out).

National Forge handled the complete production—from melting AISI E4340 steel, to forging, to hollow boring, to finish-machining—in our integrated "one-source" plant.

You say *your* forging specs are tough? Call National Forge, the company with over 40 years' experience in forging and precision-machining the tough ones.

NF

NATIONAL FORGE COMPANY

IRVINE, WARREN COUNTY, PENNSYLVANIA

NF-59-01

For more information on "the tough ones," and the machinery that makes them "best"—write for bulletin NFO

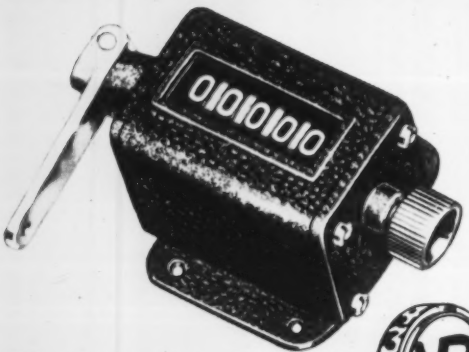
Men who Count KNOW

they can count on Veeder-Root Precision

Craftsmanship that measures up to fine watchmaking standards . . . that's what you get in Veeder-Root Counters like those shown below. And Veeder-Root precision is a *constant, known quantity* that remains unchanged under highest speeds and toughest operating conditions.

Nothing surprising about this, because Veeder-Root has been making precision counting and computing devices longer than anyone in this line of business. So if you have a touchy counting problem, bring it to The Counting House of Business and Industry.

You always "Know the score" when you count on Veeder-Root!



SMALL RESET COUNTERS

One of the most widely applicable counters made today is this rugged, reliable Small Reset Counter, available in ratchet, revolution and combined types. These and many other V-R mechanical and electrical counters are available from the nearest V-R office or your nearest authorized V-R Distributor.

Everyone can Count on

Veeder-Root INC.

Hartford 2, Connecticut

Hartford, Conn. • Greenville, S. C. • Altoona, Pa. • Chicago
New York • Los Angeles • San Francisco • Montreal
Offices and Agents in Principal Cities

We Introduce . . .

Edward N. Case, who became STEEL's metallurgical editor Aug. 11. If you don't know Ed personally, you may have read his article, "Addition of Water to Molten Salt," which appeared in *Metal Progress* and his more recent contribution to the March-April 1959 issue of *Journal of Metal Treating*: "The Prediction of Carburizing Cycles." Ed started his career as a chemist with A. F. Holden Co., New Haven, Conn., in 1941. From 1943 to 1955, he was with American Cyanamid Co., New York. His latest post there was supervisor of the metals chemicals section.

During the last four years, Ed was sales and advertising manager and also a director of the Ajax Electric Co., Philadelphia.

A native of Mansfield, Ohio, he received his B.S. in chemistry from Union College, Schenectady, N. Y., and he has done graduate work in chemistry and metallurgy at Brooklyn Polytechnic Institute in Brooklyn, N. Y.

Ed says his spare time is happily occupied by his wife and three children, plus four hobbies—golf, camping, photography, and magic. He claims his wizardry in legerdemain doesn't include transmutation of metals, but smilingly adds: "I still have a few experiments up my sleeve."

Welcome aboard, Ed.

Uniform of the Day

This fall, a leading clothier is introducing a new suit material, taconite gray, a cloth that may become to metalworking what gray flannel was to Madison Avenue.

If anyone asks if you have lead in your pants, you can legitimately reply: "Nope. Taconite."

Welding's Heated Battle Continues

On July 20, when we presented the article, "Are Too Many Tests Hurting Welding?" we had a pretty good idea people felt strongly about the subject. We asked you to put your feet up on the desk and think about the subject. You sure did! You also substantiated some of the points made in the article by Associate Editor Ross Whitehead and James F. Lincoln, chairman of Lincoln Electric Co., Cleveland.

J. A. Cerow, Chapman Valve Mfg. Co., Indian Orchard, Mass., writes: "Would it be possible to obtain 25 reprints of this article for distribution to the members of the Inspection & Testing Committee of ASA B31 Code for Pressure Piping? I feel this article might alter their . . . thinking in some instances." The reprints were sent. Mr. Cerow is chairman of the committee.

Samuel H. Clark, district engineer, American Institute of Steel Construction Inc., San Francisco, says: "This very question has been of concern to structural steel fabricators in California. It is hoped that some reader comment may be forthcoming from this area."

Howard B. Cary, director of Hobart Bros. Technical School in Troy, Ohio (right), says: "We believe that much can be done to reduce the confusion surrounding codes and tests . . . One objective should be to know and understand more about what's in different codes . . . It's only when a number of codes are considered together that one becomes confused . . . Prequalification of welding joints, processes, and procedures could be made more universal. The pipewelding industry has prequalified joint designs and procedures which have greatly reduced testing expenses . . . Reciprocity of operator qualifications is another potential area for reducing testing and allowing consequent savings . . . A single general code, consolidating requirements of existing code sections, would be beneficial . . . It could provide for various applications, industries, and levels of quality. Tests could be standardized . . . Service requirements and levels of acceptability would be established . . .

"Welding codes and specifications cannot be eliminated. Buyers demand more quality. Only by means of minimum standards can we maintain an orderly arrangement between buyer and seller that will protect the public and retain public confidence in welding."

Coming: A Trip to the Oculist

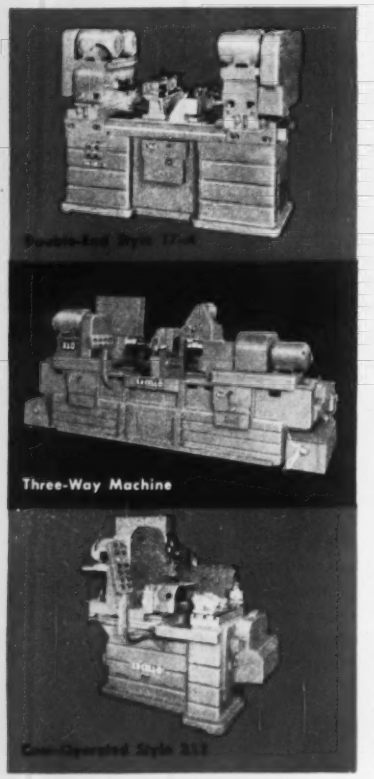
At least three of our editors are considering visits to the oculist. A booboo slipped by all of them in an Aug. 3 depreciation story.

But listen to the gentleman who alertly caught the error, Maurice E. Peloubet, New York accountant: "On Page 45 you state that the Keogh Bill (for reinvestment depreciation reform) 'calls for an additional depreciation allowance of up

INSTRUMENT PARTS OR HEAVY CASTINGS, SHORT RUNS OR MILLION-LOT ORDERS . . .

AN EX-CELL-O PRECISION BORING MACHINE FOR EVERY NEED

Ex-Cell-O Precision Boring Machines do more jobs, more accurately—Rough, semi-finish and finish Boring • Facing • Turning • Chamfering • Grooving • Taper-boring • Gun-drilling • Contouring



The Ex-Cell-O Catalog lists a wide range of standard Precision Boring Machines that meet your requirements for accuracy, speed, economy and dependability. Or call your local Ex-Cell-O Representative for details on hydraulic-actuated or cam-operated boring machines, single or double-bridge, horizontal or vertical styles, way-type machines and others in the complete line.

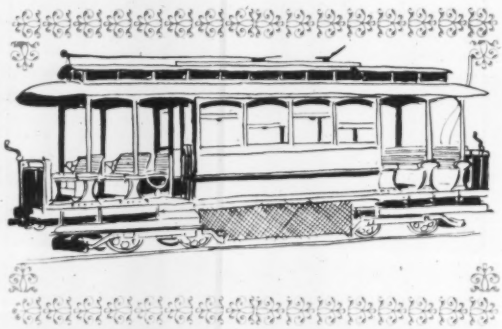
XLO EX-CELL-O FOR PRECISION

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN 59-40

to $50,000 in one year (equal to the difference between the original cost and the current value) when the same amount is reinvested within two years.'

"This is the opposite of what the Keogh Bill provides. The $50,000 is a minimum, not a maximum. An allowance of $50,000 in any one year is provided to do away with burdensome record-keeping and small adjustments.

"All of us working for depreciation reform believe the articles on the subject in your magazine have been most helpful. For that reason, I am anxious to correct this one error."



A Reviving Market

Cars like this open and closed electric bucketed along city and country rights of way in the heyday of the trolley between the 1880s and 1920s. Some 14 billion riders were carried by the Galloping Gerties in 1923; then the gasoline era choked off the trolley.

Now, urban and interurban transportation systems are being tickled back to life by new entries. Here's how STEEL became interested:

One morning, it took Associate Editor Jack Botzum an hour and a half to drive what's normally a 25 minute trip from his home to his Washington office in the National Press Building. Here's a memo to Associate Managing Editor John Morgan which Jack composed while inching along:

"Really frustrated this a.m. A fellow motorist cut into my lane and caused me to miss a green light. Then I was held up in a terrific traffic snarl. Ulcers are getting worse. Our streets are clogged each rush hour with cars carrying one or two passengers. Why don't cities employ fast (rapid) transit systems? Is finance a problem?

"Let's find out who builds urban transportation equipment; check into the future of the monorail (at least three aircraft companies are interested in this area); and see what materials, designs, speeds, and capacities the authorities have in mind for our transit systems of tomorrow."

Jack got the story. You can read about it in STEEL next week.

59-28

IT'S 'TUNE-UP' TIME FOR PRODUCTION MACHINES!

How long has it been since you "raised the hood" of your Ex-Cell-O production machines? Even the most reliable equipment will run faster, more accurately and *longer* after a thorough going-over by skilled Ex-Cell-O machine repairmen.

Ex-Cell-O machines returned for renewal, repair or modernization are carefully inspected, disassembled and reworked from base to bridge, with new machine accuracies. The products of preferential treatment, they move right alongside the newest Ex-Cell-O machines, rejuvenated by the familiar touch of the men who know your Ex-Cell-O machines best—the men who build them.

Necessary replacement parts are Ex-Cell-O "original equipment" quality; rewiring or re-worked controls conform to JIC standards; tables and ways are hand-scraped to their level-best; coolant and lubricant systems are restored to full efficiency, spindles are trued, and tooling can easily be up-dated to your specifications.

Call your local Ex-Cell-O Representative, or write direct for details on how your older Ex-Cell-O machines can be economically "tuned" to today's production demands.

EX-CELL-O FOR PRECISION XLO

EX-CELL-O CORPORATION *Machinery Division*

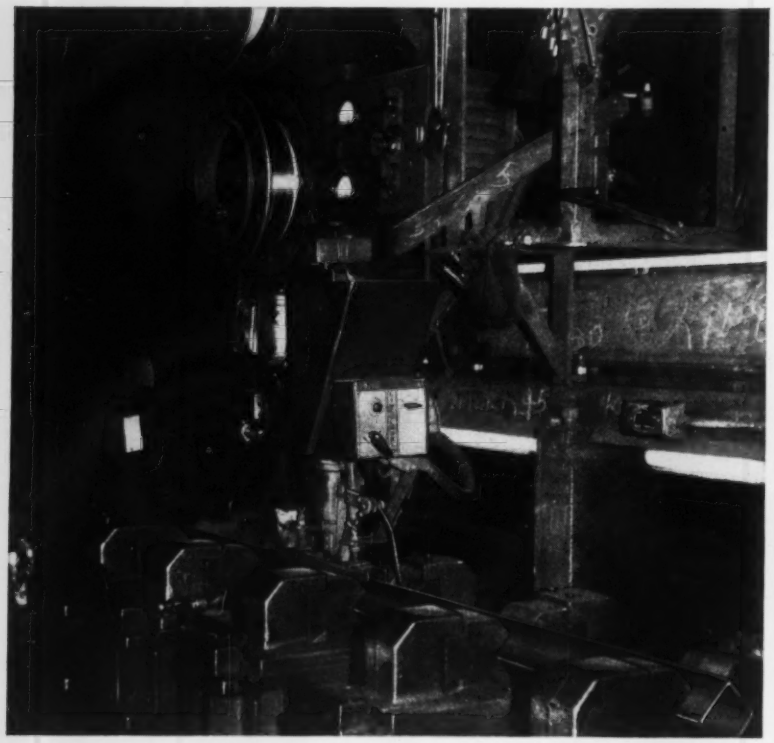
DETROIT 32, MICHIGAN

Ex-Cell-O Precision Products Include: Machine Tools • Grinding and Boring Spindles • Cutting Tools • Railroad Pins and Bushings • Drill Jig Bushings • Torque Actuators • Thread and Groove Gages • Granite Surface Plates • Aircraft and Miscellaneous Production Parts • Dairy Equipment

Lincoln

WELDYNAMICS

NEWS ABOUT ARC WELDING AT WORK CUTTING COSTS



Four foot, ¼" box beam is positioned, welded and cleaned in 2½ minutes. Lincolnweld with Twinarc welds at 90" per minute.

TWINARC SIMPLIFIES WELDING... UPS FARM MACHINE PRODUCTION

The Krause Corporation has increased production on box beams 33% with their Lincolnweld Automatic welder by adding a Twinarc attachment. This company in Hutchinson, Kansas, makes one-way plows, wheel-mounted disc harrows and chisels, self-propelled forage harvesters and other farm equipment.

The Twinarc attachment feeds two welding wires through a single submerged arc welding head, doubling the speed of welding with a single wire.

Krause fabricates the box beams from ¼" angles. The angles are put in a jig, clamped in position with hydraulic positioners. The Twinarc makes one pass on each of the two edge seams at 90 inches-per-minute.

Mr. Wilbur Thomas, Krause's Welding Foreman says, "The Twinarc not only welds faster, but higher currents make it possible to weld the angles without cleaning off light rust and oil which used to cause some imperfections when a single wire was used."

This application has proved so successful at The Krause Corporation that they are now installing their second Lincolnweld Automatic welder with a Twinarc attachment.

For help with welding procedures, or cost reduction ideas, call your Lincoln welding engineer today.

Wilbur Thomas, Welding Foreman, "Savings justified the purchase of a second machine."

Catalog Available

Complete information on Lincolnweld Automatic Submerged Arc welding equipment and accessories is contained in Bulletin 5200.1. A copy may be obtained by writing, on your letterhead to Lincoln.

THE LINCOLN ELECTRIC COMPANY

Dept. 1656 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Meeting of minds and methods

THE specialized talents of McKee engineers and the experienced skills of McKee construction experts meet on plant projects like yours all over the world. It is this meeting of imaginative engineering minds and modern construction methods that assures you correct design and sound construction of your plant.

The McKee insignia is a familiar sight to petroleum and chemical men in thirty-six countries. They're familiar with McKee results, too—that's why more than eighty percent of our work is repeat business from satisfied customers.

If you are planning new processing facilities or related projects, large or small, in any location, we would welcome an opportunity to show you the many advantages of McKee services.

ARTHUR G. McKEE & COMPANY • 2300 Chester Avenue • Cleveland 1, Ohio

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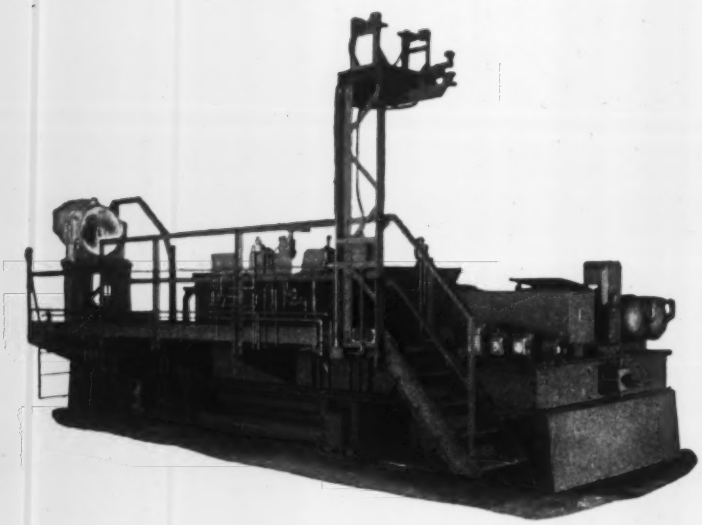
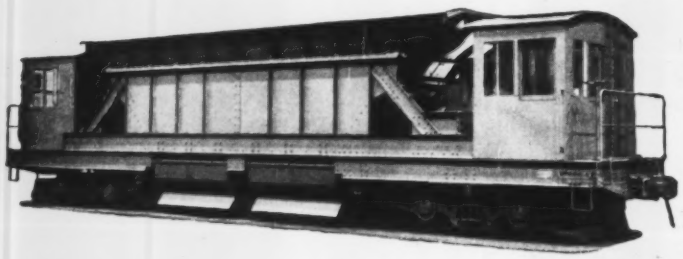
ENGLAND: HEAD, WRIGHTSON & CO., LTD. (BRITISH REPRESENTATIVES OF METALS DIV.)

McKEE ENGINEERING AND CONSTRUCTION SERVICES

HERE'S *built-in* STAMINA *that spells* DEPENDABILITY

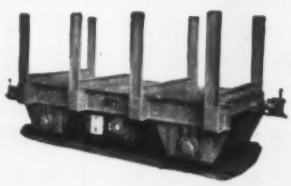


10-TON SCALE CAR, SINGLE HOPPER, BOTTOM DUMP



75-TON ORE TRANSFER, GABLE BOTTOM, SIDE DUMP

Atlas "single-lever" Safety-Type transfers give outstanding short-haul service . . . such as between buildings, for cross-bay crane service, and movement in production. Powered to meet your operating needs . . . storage battery, diesel or gas-electric, or cable reel.



Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

CALENDAR OF MEETINGS

Aug. 31-Sept. 2, Metallurgical Society of AIME: Institute of Metals Division's conference on semiconductors, Statler-Hilton Hotel, Boston. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Sept. 13-17, Pressed Metal Institute: Annual meeting, Stanley Hotel, Estes Park, Colo. Institute's address: 3673 Lee Rd., Cleveland 20, Ohio. Managing director: Harold A. Daschner.

Sept. 13-18, American Chemical Society: Fall meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 14-17, American Mining Congress: Metal mining and industrial minerals convention, Denver. Congress' address: Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

Sept. 14-17, Society of Automotive Engineers: National farm, construction and industrial machinery meeting, production forum, and display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 16-17, American Die Casting Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 16-18, National Industrial Conference Board: Marketing conference, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Sept. 17-18, American Society of Mechanical Engineers: Engineering management conference, Statler-Hilton Hotel, Los Angeles. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 18, Malleable Founders' Society: Industry meeting, Hotel Sheraton-Cleveland, Cleveland. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Sept. 21-22, Steel Founders' Society of America: Fall meeting, Homestead Hotel, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Sept. 21-23, American Management Association: Personnel conference, Astor Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

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Pleasant-to-touch, glare-reducing dashboard finished with a vinyl dispersion that *creates its own patterns.*

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Thin, leathery, "textured" finishes for metal

Something new in metal finishing: leather-like, warm-to-the-touch finishes that heat-cure to a textured finish. It's actually "texture in paint!" The base material: abrasion-resistant vinyl (of hard-wearing floor-tile fame) formulated as a dispersion for spray or dip coating. A single coat provides the complete finish. You can specify any shade or tone of color.

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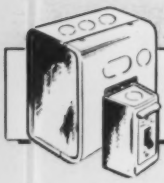
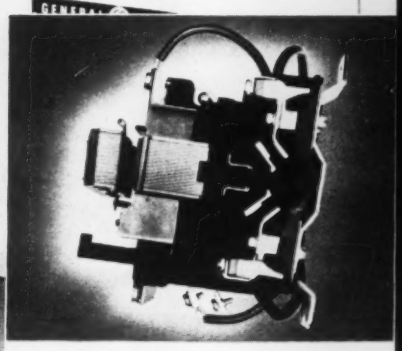


100 LINE



WEDGE-ACTION DESIGN (see cross-section cutaway) gives positive "make." A quick, clean "break" is assured by spring-loaded contacts and a low-stress "kick-off" spring.

FIELD-PROVED 100-LINE DESIGN . . .

NEW SIZE 2 MAGNETIC STARTER

General Electric now offers a Size 2 magnetic starter that is 34% smaller than previous open forms, and includes all the field-proved features of General Electric's 100-Line. You get better performance, less maintenance and greater dependability because:

WEDGE-ACTION CONTACTS provide more positive "make". Reduced armature mass and spring-loaded contacts practically eliminate bounce. Contact springs and a special "kick-off" spring provide positive "break". Vertical contacts shrug off dirt and dust.

NEW ARC TRAP DESIGN actually attracts arcs away from contacts and dissipates them harmlessly to prolong contact life.

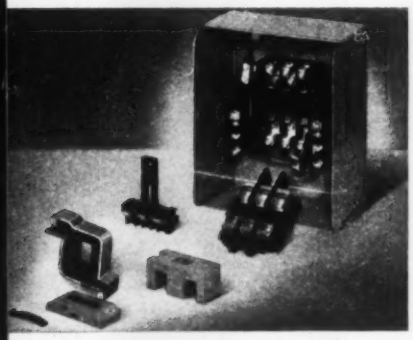
SNAP-SLIDE CONSTRUCTION makes possible complete disassembly of the starter in 20 seconds. Contacts can be removed and inspected in ten seconds.

STRAIGHT-THROUGH WIRING means no wires need be bent or looped, and all wiring is done from the front. Pressure-type terminals and 10% more wiring room speed installation.

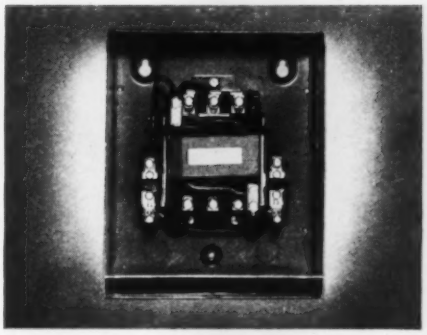
For more information, contact your nearest General Electric Apparatus Sales Office or Distributor, or write Section 733-45, General Electric Co., Schenectady, N. Y. (Ask for Bulletin GEA-6917.)

RUGGED DEPENDABILITY of new General Electric Size 2 starter is proved by severe plugging-duty torture test.

GENERAL ELECTRIC



SNAP-SLIDE CONSTRUCTION permits complete starter disassembly in 20 seconds without tools. All operating parts either snap or slide together for maximum accessibility.



10% MORE WIRING ROOM makes the new Size 2 starter easier to wire, even though it is 14% smaller than previous enclosed forms. Wrap-around cover adds extra accessibility.

STRAIGHT-THROUGH WIRING with line terminals on top and load terminals on bottom saves wiring time. All wiring is done from front, and no wires need be bent or looped.

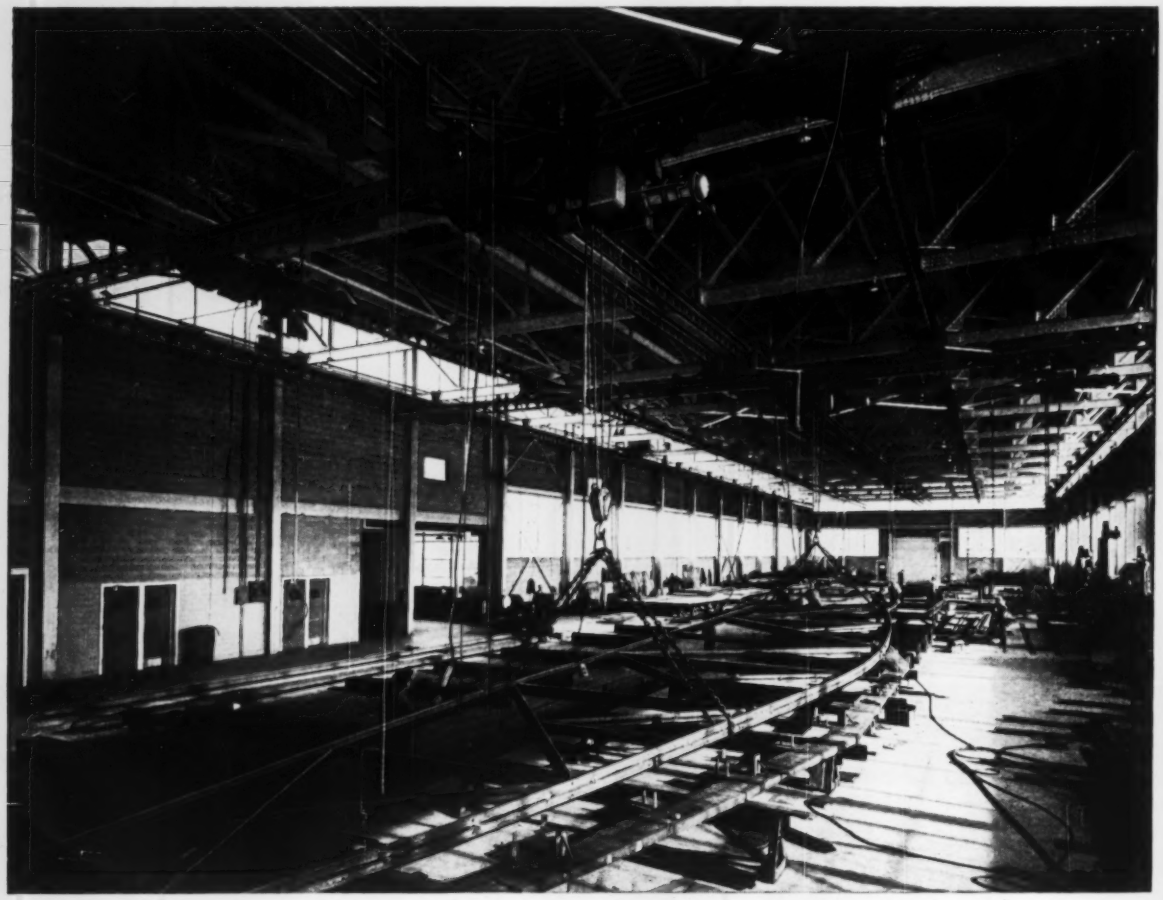
4 INTERLOCKED CRANES HANDLE 100-FOOT TRUSSES

Tramrail Transfer Cranes Provide Speed and Economy for Dominion Bridge

DOMINION Bridge Co., Ltd., is the largest steel fabricating company in Canada. It is engaged in many phases of steel fabricating work including that of building heavy overhead cranes. For this reason, it knows the need of quality materials handling equipment and how to recognize it.

Their new Mount Dennis plant in Toronto was built primarily for the fabrication of heavier plate and welded steel structures. It has a completely electrified Cleveland Tramrail system in the preparation bay which can handle loads up to 20 tons when its four cranes are worked together.

The cranes are 5 tons capacity, 3-runway, 36 and 40 feet long. They operate individually, or two cranes on adjacent runways can be locked together as a unit. Then both cranes travel together on the two 3-track runways and respond to the push-button station, suspended from the hoist carrier, like a single crane. The ability to use two or four cranes together is extremely helpful when handling large fabricated structures like the 100-foot truss illustrated.



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Overhead Materials Handling Equipment

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Q. You mean it? Weirkote can save you the cost of any further processing for corrosion protection after fabrication?

A. Absolutely. It's the continuous process that does it. Integrates the zinc to the steel so tightly there's never any peeling or flaking. No matter how severe the fabrication—any torture test you put it through—that bond stays put!

Q. Hmmm. Weirkote sounds great. One thing—is its zinc coating uniform throughout?

A. To the nth degree! Even the hardest-to-reach areas on the most complicated fabrications are completely protected.

Q. Corrosion-protected, you mean?

A. Corrosion-protected all over! So much so that you can work Weirkote to the very limits of the steel itself. So there you have it: stepped-up manufacturing efficiency, sharply curtailed manufacturing costs. All from Weirkote!

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THE OTHER TURN

THEM MASONRY SUPERS ARE SURE PUSHIN' OLD PETE SO THEY CAN GET STARTED ON THE NO.3 REBUILD.
THOSE GUYS AIN'T GOIN' TO HURRY THIS HEAT ALONG ANY.
ONLY REASON THEY'RE ANXIOUS IS 'CAUSE THIS MIGHT INTERFERE WITH THEIR SATURDAY NIGHT POKER GAME.
HM-M-M
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KUEKES

THANKS TO
VELMAR MACK
NO. 1 OPEN HEARTH
GENERAL MELTER FOREMAN
INLAND STEEL CO.
EAST CHICAGO, INDIANA

The Vultures

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

Magnefer and Syndolag Set Fast—Stay Fast

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

STEEL

Metalworking Outlook

August 31, 1959

New Accent on Featherbedding

The little man to the left is a featherbedder who, because of obsolete labor contract provisions, still gets paid although he does little or no work. Steel and many other industries are stepping up their drives to get rid of the out-of-date clauses that make the featherbedder possible. The steelmakers' early approach to this problem backfired, a mishap contributing to the length and bitterness of this strike. Now they're taking a slightly different tack (Page 27).

Carey Is Symbol of Troubled Labor

On Page 71 of the July 27 issue, STEEL called IUE President James Carey the "symbol of troubled labor." Mr. Carey proved that point last week when he threatened to do everything in his power to block the re-election of congressmen who voted for the administration-backed labor reform bill. Most observers think Mr. Carey's action will help to defeat his own purpose. Seasoned observers across the nation believe public sentiment is in favor of a positive labor reform measure. They look for the final bill to be tougher than the Kennedy measure. President Eisenhower says he assumes that no man would surrender his conscience because he received an implied threat.

Why Keep Supervisors Happy?

First: Because the quality and efficiency of your whole organization depends on how well they do their job. Second: The supervisor directly affects the attitudes of the people working under him. His improper actions can aid the union organizer or keep the grievance table filled. Third: He might join a union himself. For how to prevent that, see Page 30.

Needed: Uniform Tax Laws

Complying with federal, state, and local tax authorities probably costs your company 2 to 3 per cent of your tax bill. The National Industrial Conference Board reports the cost is proportionately greater for smaller companies. Participants in an NICB survey say much of the work is unnecessary. They believe the burden could be reduced considerably through uniform definitions, allocations, and forms. Prof. William Pierce, director, University of Michigan Legislative Research Center, warns that states should move quickly

to develop uniform tax treatment for multistate corporations. He says: "If they don't, Congress will."

What's Wrong with Job Shops?

They've got most of the same ailments that you'll find in the giants of industry. And they can cure their maladies the same way—through sound management. But the biggest problem they have is unique. It's the concentration of too many jobs in one person. The top man usually has too many titles to do justice to any of them. Many bright young executives are willing to work in the small shops—if they're given proper incentives (Page 42).

America's "Growingest" States

In terms of value added by manufacture, U. S. industrial activity nearly doubled between 1947 and 1957, a new Commerce Department study shows. Compare your area's growth with other segments of the U. S.: The Mountain States gained 169 per cent during the decade; Pacific—166 per cent; West South Central—152 per cent; South Atlantic—94 per cent; North Central—91 per cent; Middle Atlantic—74 per cent; New England—56 per cent.

Metalworking States Keep Pace

Here's how the prime metalworking states grew in value added by manufacture during the 1947-57 period: Ohio—101 per cent; New York—71 per cent; Michigan—105 per cent; Pennsylvania—86 per cent; Illinois—87 per cent; California—202 per cent; New Jersey—85 per cent; Indiana—100 per cent.

Orders to Zoom 41% for Cleaning & Finishing Equipment

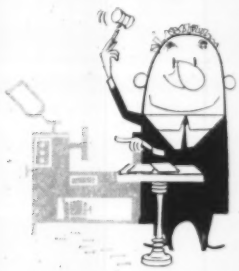
Metalworking companies will spend 41 per cent more dollars for cleaning and finishing equipment this half than they did in the last one, STEEL's survey of buyers shows. Here's how much orders will rise for seven kinds of equipment (see Page 32 for details): Painting—25 per cent; power brushing—9 per cent; blast cleaning—12 per cent; electroplating—7 per cent; galvanizing—30 per cent; pickling—5 per cent; ovens—40 per cent.

Appliance Sales Still Rising

Gas range manufacturers shipped 66 per cent more built-ins and 0.8 per cent more free-standing units during July than in the same month last year. Total gas range shipments for the first seven months of '59 were 12.3 per cent higher than they were in the like '58 period, reports Gas Appliance Manufacturers Association. The American Home Laundry Manufacturers' Association says July factory sales of washers and dryers amounted to 422,976 units—up 17 per cent from July, 1958. Sales for the first seven months of '59 rose 18 per cent from the like '58 period. Vacuum Cleaner Manufac-

turers Association reports sales of vacuum cleaners during '59's first seven months were 9.5 per cent better than in the like '58 period.

Cincinnati Milling Announces Spark Machine Family



Engineers at Cincinnati Milling Machine Co. believe that electrical discharge is a conventional machining method that needs its own standard machine tools. So they've developed a whole new family of machines (Page 62). All 33 utilize standardized building block units. Main markets will be: 1. To make odd shaped holes. 2. To overcome problems of distortion, burrs, and differential heating. 3. In diesinking. 4. To work with "nonmachinable" alloys.

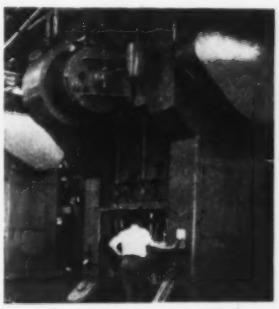
Cost of Living Index: Where 0.3% Costs $50 Million

The government's consumer price index rose 3/10 of 1 per cent in July. For companies in the auto, farm equipment, aircraft, and electrical equipment industries, it means a $50 million addition to employment costs. About 1 million workers are covered. The index adjustment boosts their wages 2 cents an hour. It raises employment costs $5.2 million a year at Westinghouse Electric Corp. alone. The July rise forced the index to a record 124.9.

USW Tries Another Angle

The Pentagon's Navy Information Office denies that the Navy asked USW members to move missile steel out of U. S. Steel's Homestead Works. Published reports said Local 1397 told the Navy it wouldn't move the steel and that the corporation was at fault for not delivering it before the strike started. One observer suggests this reason for the USW's releasing the story: "The pressure on the union is building. They'll try any means to get the public riled up about defense steel." U. S. Steel Corp. reports it has no steel for the Navy at Homestead, but does have a small quantity for Air Force missile research. Business & Defense Services Administration says there's no need for concern about supplies of defense steels.

Cold Extrusion: Money Saver for Chevy



Three Verson extrusion presses at Chevrolet's Cleveland stamping plant have trimmed the cost of making bearing races. The new method permits the use of a cheaper steel and reduces the amount of material used. Two races are extruded at one time in an eight-station indexing die (Page 64). The chipless forming method is picking up many new advocates. Main reasons: It pares material consumption, cuts down machining requirements, lowers handling costs.

U. S. Has 4,645,000 Businesses

The number of business organizations in the U. S. is at a new peak—4,645,000, reports the Commerce Department. That's 75,000 more than a year ago. More new businesses were established during the second quarter of '59 than

in any quarter since 1947. And business failures in July hit the lowest level in ten months, reports Dun & Bradstreet Inc. Businesses were failing at the rate of 49 per 10,000 last month (vs. 58 a year ago).

Pentagon's Materials Research: Boon to Metalworking

Expect the Pentagon to spend around $90 million in fiscal 1960 for materials research and development. The level will probably be maintained for several years. That's good news for metalworking since much of the work eventually finds commercial application. Among programs to watch: 1. Fabrication work on molybdenum, columbium, and tungsten. 2. Research on thermoelectric materials. 3. Work on high pressure-high temperature processes for the development of new materials. Other programs are listed on Page 36.

Curtain Walls See Fivefold Growth

The market for metal curtain wall products exceeds $100 million annually now and should easily reach $500 million in a decade, believes David J. Dugan, vice president, R. C. Mahon Co. Coming are improvements in fabrication methods, metal finishing, fastening, and assembly. Better than 25 per cent of the nonresidential building projects underway in the U. S. are "making a preference for metal siding," says Mr. Dugan. He notes demand in such diverse climates as Greenland, Hawaii, Alaska, and Midway (in the Pacific).

U. S. Buys Alloy Ores 45 Places

American steelmakers are buying alloying elements from 45 nations vs. 33 in 1947, reports American Iron & Steel Institute. Manganese now comes from 27 nations vs. ten a decade ago when Russia was the principal source. Major current sources: Brazil, India, Ghana, Union of South Africa, and Mexico. Imports of chromium ore have risen threefold since '47; U. S. production accounts for less than 10 per cent of the total annual supply. Canada remains the principal source of nickel ore. Australia is the largest foreign source of zirconium ore.

Straws in the Wind

Steelmen are keenly interested in a Navy plan to have icebreakers keep the Great Lakes open for ore shipping all year . . . July applications for GI home loan guarantees were the highest since December, 1958 . . . An FCC order permits you to use private microwave radio systems . . . Expect other industries to closely watch the service interruption insurance plan of the railroads; if successful, it could be adopted elsewhere . . . Trucks hauled 19 per cent more intercity freight tonnage in the first half of 1959 than they did in the like '58 period . . . The heat wave that hit the northeastern U. S. the last few weeks promises to reduce the carryover (units unsold at end of season) of air conditioners to about 250,000 (vs. more than 800,000 last year) . . . The Association of American Railroads asked President Eisenhower to appoint a special study commission to examine the effects of obsolete work standards, which reportedly cost the industry $500 million annually.

Photograph by famous underwater hunter-photographer Jim Thorne

DEEP SEA HUNTER FAILS TO FLAKE INLAND TI-CO®

More than a match for ferocious 700-pound hammerhead sharks, this compressed-air powered gun fires underwater spears with terrific force. Again and again its high-speed missiles pierced this Inland TI-CO galvanized sheet, yet at the edges around the holes there wasn't a trace of flaking of the zinc coating.

Yes, you can perforate TI-CO sheets. You can subject them to deep-drawing, spin-drawing, punching, crimping, Pittsburgh lock-seaming, in fact the toughest fabricating processes—*but you won't flake TI-CO!*

No wonder TI-CO galvanized sheets are top-choice with manufacturers in such a wide variety of new applications and products. TI-CO is manufactured with dry, oiled or chemically treated surfaces to meet your production needs. It comes in sheets or coils in gages 8 to 30 inclusive and in widths as great as 60 inches. Specifications, application and performance data, complete information, is all contained in a free TI-CO booklet we'll be glad to send at your request. For your galvanized sheet or coils requirements, consult your Inland representative.

Close-up inspection shows no flaking of TI-CO's zinc coating

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lockseam
work it to the limit of its ductile steel base. The full-weight coating of zinc *s-t-r-e-t-c-h-e-s*— doesn't flake or peel. Parts stay zinc-protected, rust-resistant.

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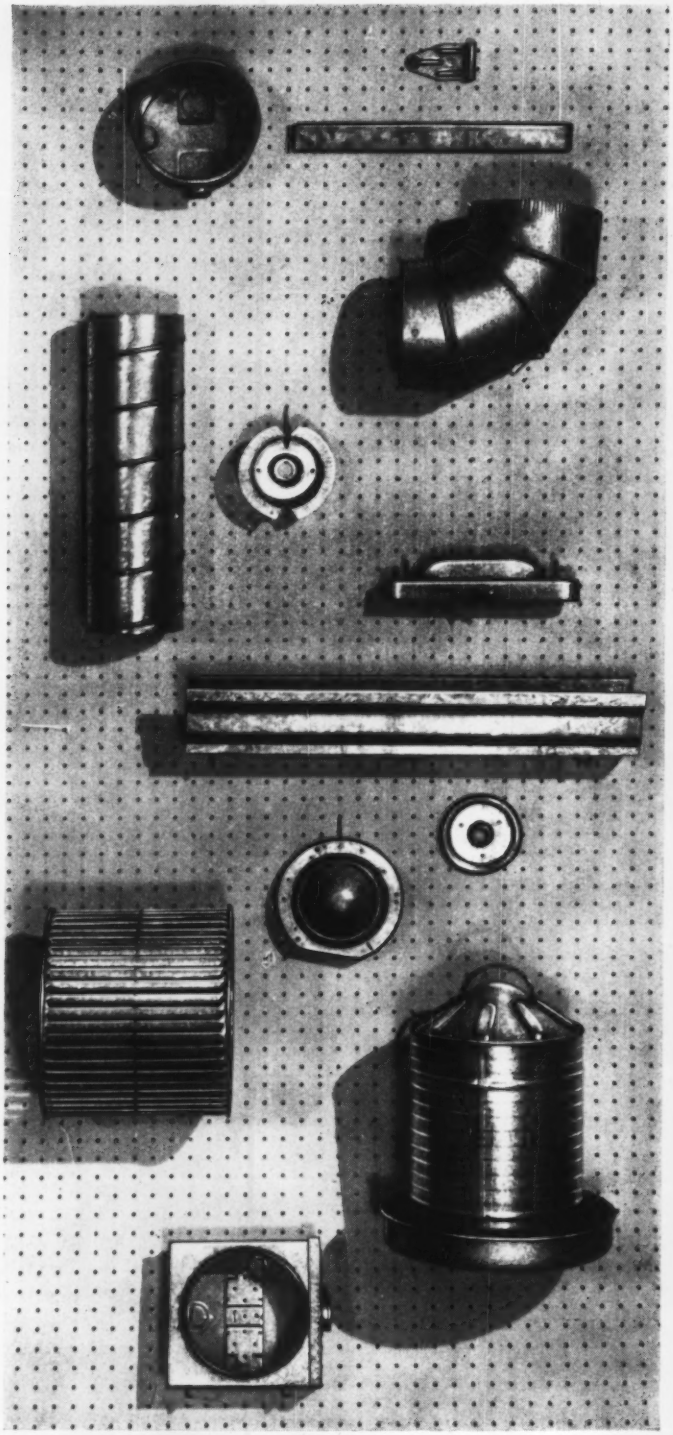

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Who Pays for Engineering?

If you decided to build a new house, chances are you would hire an architect and tell him what you had in mind, such as the number of rooms, type of construction, and year-round air conditioning.

The architect would draw up a set of plans detailing all the specifications. If the plans were approved, you or the architect would check three or four builders for the most favorable terms.

It then would be up to the builder winning the contract to deliver what he promised.

That isn't the way it generally works in the metalworking industry!

If you needed an industrial furnace, or a machining and inspection line, or a paint spray setup, you probably would contact several suppliers for suggested designs and prices.

Each potential supplier would go through the mechanics of designing and estimating costs before he could quote.

Even after several companies furnished complete data, you might change your mind and nobody would get an order. Hundreds of hours of engineering time and thousands of dollars would be wasted.

At best, only one supplier would get the order. So if there were five bidders, 80 per cent of the engineering costs still would be lost—unless by chance the plans are suitable for other jobs.

Wasted engineering is an unnecessary cost of doing business that inevitably must be paid for by the customers.

The question of who pays for engineering is a problem of long standing for which there is no easy solution.

But whether the cost is assumed by the customer, the supplier, or an engineering firm, we think it is one that should be paid for only once.

Irwin H. Such

EDITOR-IN-CHIEF

How Ryerson helped Stainless buyer solve missile component problem

Titanium stringers in stainless forged bars were recently creating a difficult problem for a manufacturer of missile parts. This company's first step in solving the problem: call in a Ryerson representative.

Selection of the wrong type of stainless was found to be the cause of the trouble. The Ryerson man pointed out that stringers are inherent in Type 321 stainless then being used. He recommended switching to Type 347 stainless. Result: the same stabilized corrosion resistance and strength—but no titanium stringers.

This is just one more example of value-analysis teamwork between manufacturers across the country and Ryerson specialists—a close association that increases the value of their metal-buying dollars. Put Ryerson on *your* value-analysis team. A discussion with your Ryerson I.V.B.M. specialist will show how you can get Increased Value in Buying Metals from Ryerson.

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Steel Tries Anew for Sensible Pact

THE STEEL INDUSTRY is shifting a few degrees in its approach to the union to try for a sensible settlement of the strike which is nearly seven weeks old.

• **Management Wants**—The steel companies' co-ordinating committee asks the United Steelworkers of America to co-operate with it in:

1. Improving the language and spirit of the labor agreements to bring them up to date with modern operations and to reduce causes of misunderstanding and friction that have developed in the past.

2. Protecting thousands of innocent workers by discouraging irresponsible acts of a lawless few who engage in wildcat strikes.

3. Retarding further inflation by dropping the experimental cost-of-living adjustment clause in the 1956 agreements. That clause, intended to spare steelworkers from the effects of inflation, has proved to be inflationary and thus self-defeating. All the 17 cents an hour added to wage rates under the clause since 1956 would be retained.

• **Union Would Get** — In return for agreement on those contract changes, the industry would sign a two-year pact providing an increase in pension and insurance benefits this year and a modest increase in wages next year.

Adds the steel committee: "Such an agreement would place the steel companies in a stronger position to compete with other materials and with steel imports. It would give employees improved benefits, higher wages, and greater job security. It would help hold the line against inflation. This proposal does not threaten the basic rights of union members in any way."

• **Evolution**—The proposition is the latest in a three stage evolution of proposals by the steel industry. First came management's stand for a straight extension of the 1956 contract for one year, with reconsideration of economic issues in 1960. Next, on June 10, came the much publicized eight proposals to modify contract language so inefficiencies could be remedied and wildcat strikes minimized.

The industry came to regret the June 10 proposals because of the way newspapers have handled them and because of the propaganda hay USW President David McDonald harvested. He convinced members they were union-busting proposals.

• **Backfire**—Industry's aim was to show flexibility—to let Mr. McDonald know that he could have a face-saver. The union president used the escape hatch, but not as industry thought he would. He charged that steelmakers were out to reduce workers to slavery. Fear psychology worked wonders where economic appeals failed with his men. Resistance hardened, and that was one factor leading to this long, bitter strike.

One problem with the eight proposals was that they were not presented in newspaper articles as the negotiators intended them to be. Much emphasis was put on examples of waste that could be eliminated if the proposals were accepted. That alarmed steelworkers about their job security and led to hours of quibbling at the negotiating table about relief operators in air conditioned crane cabs and other alleged featherbedding.

• **Aim for the Future** — Actually,

Strike Losses

(through Aug. 31)

Lost Steelworker Wages

$489,200,000

Lost Sales

$1,428,000,000

Lost Production **(ingot tons)**

13,588,800

Other Losses

Overhead, depreciation, and salaries of nonproduction workers in steel.

$272,000,000

Tax Losses to U. S.

$315,000,000

Here's the Word on Featherbedding

WHAT is featherbedding? How did the term arise? In modern labor language, it means padding the payrolls with unnecessary jobs.

American railroading lore has it that the word acquired a special connotation for industry after a scene in a caboose on the Chicago, Rock Island & Pacific Railroad. Train crewmen complained that the mattresses in their bunks were too hard and lumpy—they were filled with corn husks. The supervisor's response was: "What do you want, featherbeds?"

Today's meaning (a soft or unnecessary job) may also stem from early English usage. Centuries ago, a featherbedder was an object of scorn, a person who couldn't do his regular work well, but got ahead by courting important people, especially women.

steel management is not primarily concerned about specific cases of inefficiency that have occurred in the past.

What the industry wants to do is to correct contract language and union attitudes so that new cases of waste won't result in the future. The old cases will be worked out gradually.

So gun shy are the four industry negotiators about "examples" of waste that they would show STEEL editors only those which have been well publicized. "What we want is a co-operative attitude on the union's part," they say. "That would pave the way to enable the companies to generate new economic progress to be shared with employees."

• **New Proposal**—The latest industry proposal for a sensible settlement is an attempt to correct the errors of the earlier eight points. Will the new approach succeed? Mr. McDonald's early reaction was not favorable.

The AFL-CIO Executive Council made clear it expects the strike to last at least until Sept. 18 when it has scheduled a rally to spur support for the USW. The federation's convention will be in San Francisco at that time.

• **Presidential Action?** — President Eisenhower reiterates that he'll keep out of the dispute directly until its effects begin to endanger the national welfare. Best guess on when that will be: Sometime between Sept. 15 and Oct. 1.

R. Conrad Cooper, the steel industry's chief negotiator, says that the companies are prepared if the U. S. invokes Taft-Hartley's 80 day cooling off period. He says the companies would prefer to settle the strike by direct bargaining. But Mr. McDonald says T-H should not be used: "This would settle nothing." T-H invoked early in October would postpone the crisis until just before Christmas. In July and early August, the union was not against invoking T-H.

• **Balance of Power?** — Mr. McDonald says the USW's treasury surplus has remained stable at $33 million. The union is receiving about $2.5 million a month in dues from workers not on strike —more than enough to take care of the "few hardship cases."

More examples of companies that have to curtail or close operations because of a steel shortage are turning up, but the large majority of users still have enough of the metal to last until mid-September. A bare majority have enough to go into October or later (see Page 85).

Last week stocks dipped 175,000 tons among steel service centers, reports the American Steel Warehouse Association. Industrial steel inventories are at 3,125,000 tons compared with 3.7 million at the start of the strike. Although warehouse stocks are being depleted at the rate of about 5 per cent a week, they are still higher than they were at the start of the 1956 steel strike.

Steel Contracts Extended

The United Steelworkers has extended several contracts. The pact at Timken Roller Bearing Co., Canton, Ohio, which expired Aug. 24, was extended 60 days. That at Aetna-Standard Engineering Div., Blaw-Knox Co., with plants at Warren, Ohio, and Ellwood City, Pa., was extended 30 days after the national strike ends. Southwest Steel Rolling Mills, Los Angeles, was extended to Oct. 1.

Operations have resumed at Calumet Steel Div., Borg - Warner Corp., Chicago Heights, Ill., following a vacation shutdown, Aug. 10-24. Present ingot capacity: 120,000 tons annually.

Detroit Steel Corp.'s contract has been extended indefinitely.

How to Keep Supervisors Happy

Supervisors Want:

1. Money.
2. Recognition.
3. Opportunity to advance.
4. To be kept informed.

Management's Answer:*

1. Sizable pay spread between supervisors and first-line workmen.
   Better fringe benefits.
   Salaries competitive with those of other firms in industry and area.
   Periodic reappraisal of salary scales.
   Compensation for overtime.

2. Time off for personal business.
   Longer vacations.
   Authority to make decisions.
   No time clocks.
   Separate lockerrooms.
   Separate diningrooms.
   Separate clubs.
   Barber shop privileges.
   Parking privileges.
   Annual medical checkup.
   Special colored badges, hats, etc.
   Unlimited gate privileges.
   Where possible, such things as a private office, phone, and desk.

3. Committee assignments.
   Management development courses.
   On-the-job training.
   Night classes.
   Periodic job appraisal and personal progress reports.
   Counseling on intercompany opportunities.

4. Briefing sessions by top management.
   Dinner meetings.
   Management, foreman, labor relations newsletters.
   Group meetings and conferences.
   "Open door" to higher management.

*This is a compilation of what some progressive companies are doing. Few do all. Programs, by necessity, have to be geared to such things as company policy and the industry.

A LEADING industrial relations executive asserts: "Most management people treat supervisors much as they do their wives—they're so accustomed to having them around they take them for granted. This can cause as much trouble in the efficiency of an organization as it can in a marriage."

His analogy isn't flip. The supervisor may well be the keyman in your organization. He is management to the bluecollar people on the machines and behind the welding masks and to the whitecollarites in offices and laboratories. How he thinks and acts has a direct effect on output, quality, and morale.

• **Understand Him** — Supervisors want the same things we all do (see list): 1. Money—He wants to make substantially more than the people under him, both in salary and fringe benefits. He wants his compensation to be as good or better than that of his counterpart in a competitor's plant. 2. Recognition—He wants to feel important, to know that his job is vital to the company's welfare. When he does a good job, he wants to be told. 3. Information—He wants to know what's going on. He hates to hear company plans and developments in the barber shop. 4. Advancement—He wants to better himself and to know his chances for advancement. He's grateful for on-the-job training and night classes that help him realize his goals.

• **A Guide**—Measure your attitude toward supervisors with this checklist devised by Titanium Metals Corp. of America:

• Are supervisors made to feel that they are important and necessary members of the management team? Do nonsupervisory personnel regard all classes of supervisors as management?

• Are they better informed on company policies and plans than the employees or public?

• Are their salaries as good or better than supervisory salaries in area firms?

• Are they allowed enough freedom of action and decision to develop responsibility?

• Are supervisors granted any more benefits or conveniences than nonsupervisors: Longer vacations, spe-

cial meetings, reserved parking spaces, recreational activities?

• Are supervisors granted access to higher management and specialists without too much red tape?

• **Two Roads** — You can follow many paths to good relations with supervisors. Here are two different approaches which have kept supervisors happy.

International Business Machines Corp. has no union, and all employees are salaried. Everyone is treated the same. Supervisors get no special privileges: They eat in the same diningroom, park in the same lot, receive the same fringe benefits. "Our company minimizes status symbols," explains W. W. LaBarre, assistant to the director of manufacturing services. "Rather, we believe in a providing opportunities for our people to keep moving up the ladder (some IBM execs started in the plant). This is one of our prime concerns."

General Dynamics Corp. feels the symbols of status are eagerly sought by all workers. Carlton M. Barlow, director of personnel development, sums up the corporate attitude: "We want to give our supervisors the feeling they are really a part of management. We want them to have status and prestige."

At the corporation's Electric Boat Div. (Groton, Conn.) these are among the things being done: Fringe benefits are better; supervisors are rotating members of a committee that acts as consultant to top management; an annual supervisors' banquet is attended by top brass; and special privileges (Example: They don't punch time clocks) are granted.

Supervisors also wear an identifying lapel button, and the division publishes a booklet, "The Button," which is for supervisors. The lapel button carries a lot of prestige; it's like the pin worn by members of an exclusive fraternity.

Both General Dynamics and IBM have similar setups in two important areas: 1. Programs to help supervisors improve technical and management skills. 2. A system to keep employees informed on company plans and policies.

• **The "Charm" Approach**—Union Carbide Metals Co., division of Union Carbide Corp., runs a human relations course for its supervisors dubbed by initiates as the "charm school." The purpose: To smooth supervisory techniques.

Union Carbide also runs supervisor-oriented courses on the union contract—including what it is and what it covers.

Education of supervisors is described by a company spokesman: "We hold classes outlining the fundamentals of the ferroalloy industry—physics, chemistry, production, engineering, cost, marketing, product use. Our purpose is to teach the supervisor about functions of the company other than his own. This way he gets an idea of our whole operation and gains respect for other departments and occupations."

• **Where Management Flunks** — One of the problem areas is the clogged line of communications between the top and bottom. For every firm making good progress on this problem, two others have slipshod or nonexistent procedures. Another boil: Supervisors aren't getting proper recognition. You could have trouble if your supervisors feel the only difference between them and a craftsman is a lot more work and a little more pay.

• **Warn Your Personnel People** — While recognition's important, don't go overboard on status symbols. Front line supervisors have to work closely with their men. You don't want outward signs of recognition to force too many cleavages in the plant.

• **Why Worry About Supervisors?** —First, and most important: The quality and efficiency of your whole operation depends on how well he does his job.

Can Supervisors Organize?

It's a Fuzzy Area of the Law

Taft-Hartley Act says: Any group of employees that forms a union has to come within the framework of Taft-Hartley and decisions of the National Labor Relations Board to be recognized by NLRB. The act specifies that any such group "shall not include . . . any individual employed as a supervisor."

Taft-Hartley does not say it is illegal for supervisors to form or join a union. But it does say it is an unfair labor practice for management to dominate a union. A supervisor, by definition, is a representative of management. If foremen, for example, were to dominate a union of rank and file employees, it would probably be considered illegal.

Conclusion: If supervisors band, their group wouldn't be considered a union under Taft-Hartley and wouldn't be certified by the NLRB. In any event, management wouldn't have to recognize a supervisors' union because the law doesn't. But don't rule out the possibility that supervisors in a given plant could force management to grant their demands by threatening a strike or using other economic pressures.

Second, he directly affects the attitudes of the people working under him. A bad supervisor can impair the efficiency of subordinates and have a direct effect on labor relations. If your plant is nonunion, his conduct can sow fertile seed for the union organizer. In a union plant, he can keep the grievance table filled.

Third, supervisors might organize. Such a group has no legal standing (see explanation of Taft-Hartley in box on Page 30), but that wouldn't necessarily keep them from getting together to force reforms or gains. Sure, you wouldn't have to recognize the group and could even fire the ringleaders, but what good would that do if the group walked out?

The law and court decisions on supervisors' organizations are complicated and confused. For example, could the United Mine Workers (which doesn't conform to NLRB requirements and doesn't come under its jurisdiction) form Local 201 of supervisory workers at a plant where they have Local 200 of hourly workers? The NLRB itself isn't quite sure—it would probably take a court decision (which might be pertinent only to the one set of facts).

In certain cases, it's possible that supervisors could belong to the same local as the rank and file. Take the construction and printing industries, for example. A man can be a foreman one month, just one of the boys the next, and a foreman again the following month. It's O.K. for unions to organize him.

• **Union Attitude**—Most national unions scoff at the idea of organizing supervisors. Says the United Steelworkers of America: "Even if we could, we wouldn't go after supervisory people because we don't want to work both sides of the street." The AFL-CIO says it doesn't want supervisors because they are "agents of management." But this didn't stop them from organizing in the postal and railway fields.

• **Danger**—There is little agitation to organize supervisors. But it's not the case with whitecollar personnel. Like supervisors, whitecollarites tend to think of themselves as being closely allied with management; they look down on unions.

But that doesn't put them beyond union reach. For instance, officeworkers at an eastern electronics firm recently voted for the union to represent them after having balloted "no union" in three prior elections. Reason: Some layoffs had occurred during 1958. Instead of a systematic and thoroughly understood method of furloughing, supervisors had arbitrarily laid off people—without regard to such things as seniority, family status. Workers decided they needed a union for their own protection.

That's one of the three biggest complaints of whitecollar workers. The second: Inequitable distribution of overtime (also a common gripe among bluecollarites), through lack of a formal program or because a supervisor plays favorites. The third: Poor handling of grievances. You must have a system to arbitrate differences.

• **Readying Siege Guns** — Union membership is shrinking in some areas. Automation will cause bluecollar ranks to dwindle more. The only chance for long range growth (and perhaps survival) is the whitecollarite, and the union knows it. That's why unions that have already made inroads into the whitecollar field—the USW (90,000 whitecollarites out of 1.25 million members), UAW (100,000 out of 1.2 million) and the IUE (40,000 out of 475,000)—will strengthen their drives to organize nonhourly people.

• **Solution** — Now is the time to overhaul your public relations with your own people. Find any friction areas—and eliminate them. Oil your communications machinery. Make sure you have trained supervisors, efficient in their specialty and in dealing with people. Give them prestige, authority, and a chance to advance.

"Remember," says the National Association of Manufacturers, "organization of whitecollar people is not so much a union victory as it is a management defeat."

• This is the first of a three-part series on how to deal with employees. The Sept. 7 article will delve into the general area of communications. On Sept. 14 communication problems in conferences will be covered. An extra copy of any of these articles is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

TRACTOR STEERING CLUTCH DISCS are being inspected before shipment at American Brakeblok Div., American Brake Shoe Co., Cleveland. They're used in track laying tractors to operate either track forward or reverse at any speed. The unit is made of sintered metal bonded to steel and can operate dry or in oil. As many as 18 discs go into a clutch assembly

OUTLOOK FOR CLEANING AND FINISHING EQUIPMENT . . .

Painting Equipment

ORDERS will be 25 per cent higher in the second half than in the first. The 1959 total will be 5 per cent above '58's. Next year's orders should exceed this year's by 10 per cent.

PRICES won't rise; they may decline.

BEST BUYERS: Auto, farm equipment, and electrical machinery and equipment firms.

DELIVERIES are rapid with order backlogs about 20 per cent above the Jan. 1 level.

Power Brushing Equipment

ORDERS in the second half will be 8 to 10 per cent above the first half's. The 1959 total will exceed '58's by 15 per cent; 1960's will be up about 10 per cent from '59's.

PRICES will rise an average of 5 per cent this half.

BEST BUYERS: Electrical machinery and equipment, aircraft, auto, oil field suppliers.

DELIVERIES are good with backlogs slightly above the Jan. 1 mark.

Industrial Drying & Baking Ovens

ORDERS in the second half will climb about 40 per cent above the first half's. Orders this year will exceed 1958's by about 25 per cent; 1960's will equal '59's.

PRICES: A few hikes of about 3 per cent are coming.

BEST BUYERS: Aircraft, auto, machinery, and a variety of metal fabricators.

DELIVERIES are normal with backlogs 30 to 40 per cent above the Jan. 1 mark.

THE CAPITAL SPENDING **BOOM** BEGINS

Orders Will Shoot Up 41%

CHANCES ARE that you'll soon be forced to modernize your cleaning and finishing facilities. Reason: Your competitors are updating theirs.

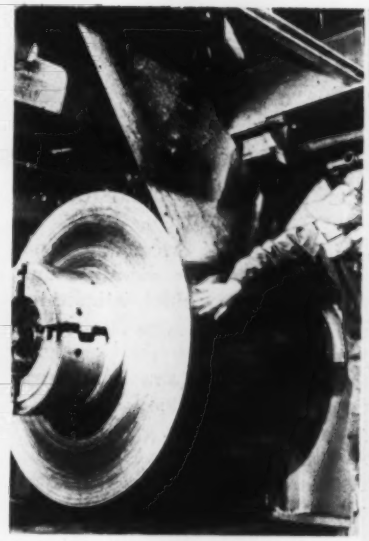
Proof: STEEL's survey of equipment buyers (July 13, p. 56) found that metalworking companies will spend 41 per cent more for cleaning and finishing equipment in 1959's second half than in the first.

Compare your spending increases with the average for your industry:

Aircraft	Up 77%
Automotive	Up 59%
Electrical machinery & equipment	Up 29%
Farm equipment	Up 21%
Foundry	Up 12%
General industrial machinery	Up 19%

Many steelmakers at midyear were planning big outlays for new cleaning and finishing facilities. The plans would have boosted the steel industry's spending by 41 per cent (in the second half vs. the first). But, with the strike still dragging on, some orders may be delayed until 1960.

Export second half export sales of cleaning and finishing equipment to equal those of the first half. Only



Galvanizing Equipment

ORDERS: Second half volume will rise 30 per cent above that of the first half. Volume for the year will be 50 per cent better than 1958's; 1960 volume will beat this year's by 20 to 25 per cent.

PRICES: A 5 per cent hike is likely.

BEST BUYERS: Steel, auto, and chemical industries and makers of small parts.

DELIVERIES vary with supplier as backlogs range from same to 200 per cent above Jan. 1 mark.

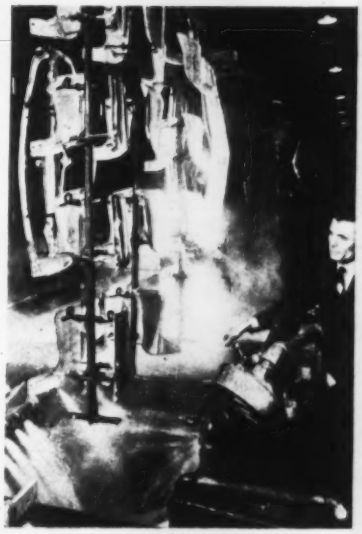
Blast Cleaning Equipment

ORDERS in the second half will be 12 per cent above those of the first. Orders this year will be 30 per cent greater than '58's; 1960's will exceed '59's by about 15 per cent.

PRICES: Scattered hikes of 4 to 7 per cent will come this half.

BEST BUYERS: Aircraft, auto, components, foundry.

DELIVERIES will be a little slower than last year's; order backlogs range from 20 to 150 per cent of the Jan. 1 level.



Electroplating Equipment

ORDERS: They'll be 7 per cent higher in the second half than in the first. This year's volume will surpass last year's by 13 per cent; 1960 volume will be about 15 per cent above '59's.

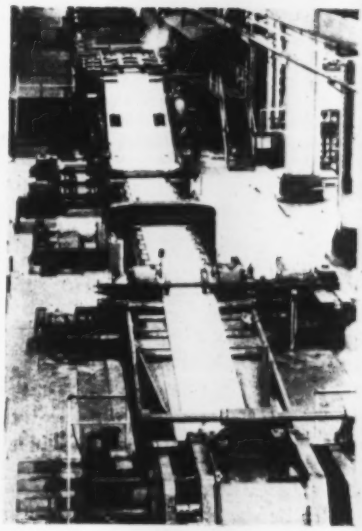
PRICES: 2 in 5 makers will effect hikes. The range: 3.5 to 10 per cent.

BEST BUYERS: Appliances, aircraft, auto, electronics, general industrial machinery.

DELIVERIES are rapid with backlogs up around 20 per cent from Jan. 1.

1 in 11 makers predicts improvement. None forecasts a decline.

• **Foreign Threat Intensifies**—Foreign competition is not yet a serious problem in the domestic market for cleaning and finishing equipment. But U. S. producers see their export markets slipping away. To many, that signals a foreign effort to move into the U. S. Major competition is threatened by German, Italian, and English firms. Austrian, Swiss, and French manufacturers are also threatening U. S. markets for electroplating equipment. And a French firm is attempting to widen its



Pickling Equipment

ORDERS will be 5 per cent higher this half than last. Volume this year will be 24 per cent above last year's; that in 1960 will be 5 per cent higher than 1959's.

PRICES: Spotty hikes are coming. The average: 5 per cent.

BEST BUYERS: Steelmakers, metal fabricators, component industries.

DELIVERIES are normal to slower as backlogs range from same to 500 per cent above the Jan. 1 level.

markets for blast cleaning equipment, at the expense of U. S. producers.

Look for foreign competition to get tougher in all lines. Possible exception: Paint spraying equipment. Producers of electroplating, galvanizing, power brushing, blast cleaning, and pickling equipment are nearly unanimous in expecting competition from abroad to become more severe. No one sees the threat diminishing; a few expect the situation to remain about the same.

• **Prices**—Expect price fighting to remain fairly active in most lines. But look for many producers to jack up their charges in an effort to firm quotations.

STEEL asked leading producers in each field to classify price competition in their industry. Here's the majority report: "Active" in paint spraying equipment; "serious" in pickling equipment; "active" in power brushing equipment; "active" in blast cleaning equipment; "serious" in industrial drying and baking ovens; "active" in galvanizing and electroplating equipment.

Few producers expect the situation to change before yearend. Most say price fighting is easy to start but extremely difficult to stop.

• **Steel Strike's Effects**—Next week, 1 in 7 producers will have to cut back operations due to lack of steel. Most of the others say their stocks will last until late September or early October. A few have large enough inventories to carry them into November. At least half the makers of cleaning and finishing equipment will still be operating normally if the strike lasts beyond Oct. 10.

Most producers say the strike hasn't forced much curtailment of orders yet, except from the mills, themselves. But they warn that steel consuming companies may delay placing equipment orders if the strike drags on much longer.

• Extra copies of this report are available until supply is exhausted. Write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. This is the eighth article in STEEL's new semiannual series on the outlook for capital equipment. It's based on a survey of selected companies representing nearly one-third of metalworking's total spending for capital equipment.

How 7 Industries Are Doing

Taking a midyear look at some important industrial production indicators, the Business & Defense Services Administration finds that most are fulfilling their early promise

A GENERALLY expanding industrial economy, only slightly dampened by labor troubles, is indicated by a series of midyear reports on several industries by the Commerce Department's Business & Defense Service Administration.

• If apparent demand is realized, aluminum shipments will exceed the previous peak year (1956) by 10 to 12 per cent.

Aluminum shipments to consumers in the first four months of this year were 46 per cent over those in the 1958 period. Other gains in the first four months: Mill product shipments were 34 per cent higher, and ingot shipments for uses other than mill products were 82 per cent higher.

Primary production of aluminum rose 17 per cent; production of castings, in the first two months, was up 16 per cent.

Capacity for producing primary aluminum more than doubled between 1950 and 1958. Another 20 per cent increase was completed in 1958, bringing capacity to 2.2 million tons, with the prospect of another 0.2 million tons being added this year.

• Shipments of copper and copper-base mill and foundry products were at the highest level in 2.5 years during the last quarter of 1958. They rose 6 per cent in the first quarter of 1959.

Inventories of refined copper, which hit 367,000 tons in June, 1958, dropped to 181,000 tons as of March, 1959, and to 169,000 tons by Apr. 30. Only 29 per cent of available copper was in the hands of refiners.

Shipments of mill and foundry products this year are expected to show a gain of 15 to 20 per cent over 1958's. Reasons: An accelerated pace in motor vehicle production, residential construction, and capital expenditures. The gains may be seriously influenced by the strike which has closed 75 per cent of basic mining operations in the U.S.

• New telephone installations in the U. S. should reach 3,933,000 units in 1959, bringing the national total to 70,563,000 by yearend.

The uptrend in installations represents a 5.9 per cent increase over 1958's, when 3,009,000 new units were put in.

New plant and equipment expenditures by the communications industry ($2.53 billion) fell below the 1957 level last year. The Commerce Department estimates that this year's spending will reach $2.6 billion.

• First quarter shipments of construction machinery and equipment were at a lower rate than they were in the fourth quarter, but a pickup became apparent in the second quarter.

Indications are that this may be the second largest production year for the industry in terms of dollars. It would mark a modest improvement over the last two years and a sales record second only to that in 1956. The all-out production capacity of the industry is estimated at $2.8 billion annually. This year's production is expected at about $2.2 billion, barring an extended steel strike.

• Reversing the decline of 1957-58, the steel shipping container industry expects business to improve 5 to 10 per cent.

Shipments of steel barrels, drums, and pails in the first quarter were 10 per cent above where they were in the like period of 1958. Drum deliveries increased 9 per cent; pail shipments rose by 11 per cent. Unfilled orders at the end of March were 30 per cent above the 1958 level; order positions were up 56 per cent.

Although some of the early buying was based on an expected steel shortage, user stocks are being consumed faster than expected. The in-

dustry expects demand to continue strong through the third quarter.

• Capital expenditures for textile machinery this year will top the 1958 level by 30 per cent.

Increased expenditures will go for modernization and replacement since mills have begun to replace obsolete capacity with automated equipment. Spending this year may equal the 1957 rate.

Shipments of machinery in the first half equaled the year-ago rate, but scheduled deliveries for the third quarter will exceed that level by 50 to 60 per cent.

• Manufacturers' sales of household appliances in the last half should run 10 per cent ahead of those in the 1958 period; the year-to-year rise should be about 15 per cent.

The strong uptrend in appliance sales which started late in 1958 continued this year. Outstanding gains were in built-in ranges, up 45 per cent; freezers, up 42 per cent; washer-dryers, up 41 per cent.

The outlook for appliance sales in the second half continues to be good. (It's based on housing starts, expected to total 1.25 million units, and home improvements and maintenance expenditures, expected to be made by 25 per cent of consumers.)

Turbine Parts Bought Abroad

Baldwin-Lima-Hamilton forced to use European materials to win TVA bid. Firm blasts administration of Buy American Act. Claims 6 per cent differential illegal

THERE IS IRONY in Baldwin-Lima-Hamilton Corp.'s successful bid on three hydraulic turbines for the Tennessee Valley Authority: The firm had to go to Europe for "a substantial amount of material" to underbid English Electric Export & Trading Co.

The company bid $2,313,000 on TVA's Wheeler Dam turbines compared with the English firm's $2,354,305.

• Regret — Commenting upon its low bid based on foreign components, B-L-H said: "It is with great regret that the management deemed it necessary to use a substantial amount of foreign material and labor." But it found no alternative.

It also noted that if government policies continue: "American manufacturers of these products will either have to purchase substantial portions of their turbines abroad or go out of business."

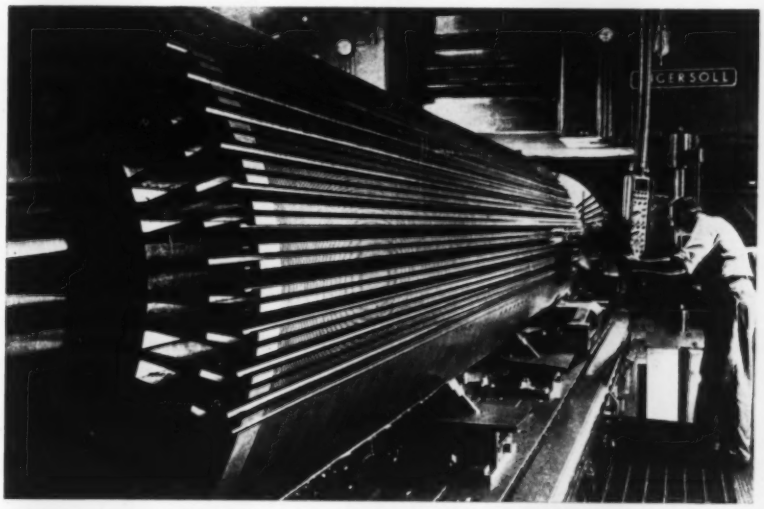
• Buy American Fiasco—B-L-H has maintained a steady fire against the administration of the Buy American Act. Its claim: A 6 per cent differential on bids is illegal. (The U. S. manufacturer of products for sale to Uncle Sam can bid 6 per cent higher than a foreign company and still receive the contract. If he's in a labor surplus area, he gets another 6 per cent.)

B-L-H also calls the differentials "completely unrealistic" when U. S. component and labor costs are considered. It argues that the original act made no mention of a percentage differential and implied nothing as low as 6 or 12 per cent. Thus far, it has made little headway in arguments with government officials.

• Letters to Congressmen—B-L-H management, aware that their decision to buy components overseas will become a political issue, wrote Pennsylvania and California congressmen: "Such purchase abroad does not warrant maintaining extensive facilities in this country which could not be otherwise profitably utilized."

In other words, B-L-H thinks the domestic turbine industry is on the threshold of disaster. The possibility of some sort of Congressional investigation this late in the current session is discounted, but several Capitol Hill offices are known to be gathering material on the Buy American issue in preparation for a demand to reopen the question.

• Illogical Policies—B-L-H is also hitting the Army on its inconsistency in awarding contracts. The company won the Greers Ferry contract from the Army even though it overbid English Electric by more than 12 per cent. That award, made in January, was on the ground that B-L-H had a large complement of elephant tools which must be kept operating for national security reasons. In May, with no apparent differences in the situation involved, the Army awarded the Big Bend contract to English Electric.



ROTOR FOR A STEAM TURBINE GENERATOR unit (rated at 150,000 kw) is being milled by Allis-Chalmers Mfg. Co., Milwaukee. It will be installed at the Enrico Fermi atomic electric powerplant near Monroe, Mich. The plant, using a large, fast breeder reactor, will be able to supply power needs for 250,000 people. It is expected to be operated at full capacity sometime after 1960

Pentagon O.K.'s $90 Million For Materials Research

WITH the $20 million augmentation approved June 30, the Defense Department's Research & Engineering Office estimates Pentagon spending for materials research and development will reach $90 million in fiscal 1960. That level is expected to be maintained for some years. The work is carried on by the three services under the direction of Herbert F. York, director of defense research and engineering.

About $50 million is spent each year in various research and development programs; another $20 million in manufacturing methods (fabrication and processing) involving the scale-up of materials. The $20 million augmentation will be spent for the following projects:

Project Breakdown

- Solid propellent rocket motor materials for casings, nozzles, and controls. Engineering, fabrication, and testing included.
- Thermal protection systems (combinations of structural and insulating materials to provide highest strength-weight ratio for structural strength in high temperature environments).
- Refractory metals fabrication program: Commencing with molybdenum and its alloys, following with columbium and tungsten and their alloys.
- Refractory metal and alloy research: Columbium, tantalum, molybdenum, and tungsten and their alloys.
- High temperature polymers (including inorganic for use to 1000° F and above) for structures, adhesives, and sealants.
- High temperature ceramics, including adhesives as well as structural materials (nitrides, borides, carbides, glass, Pyroceram, etc.).
- Thermoelectric materials.
- Fabrication and processing: Forging, extruding, welding, casting, etc., including such processes under vacuum or inert gas.
- Titanium: Extension of the sheet rolling program to include weldable alloys, alloys for higher temperature, new processing methods, and sandwich construction.
- Nondestructive testing methods.
- Plasma jet research for coatings, synthesis of new materials, and for the dissociation and purification of materials.
- High pressure-high temperature processes for the development of new materials.
- Composite materials: Those strengthened by fibers or dispersed particles of other materials and laminates.
- Plastics information center.
- Graphite.

The three services divide the money about equally, but each service gets its programs exclusively, except refractory metals and alloys research, and fabrication and processing development. They are divided between the Air Force and Navy.

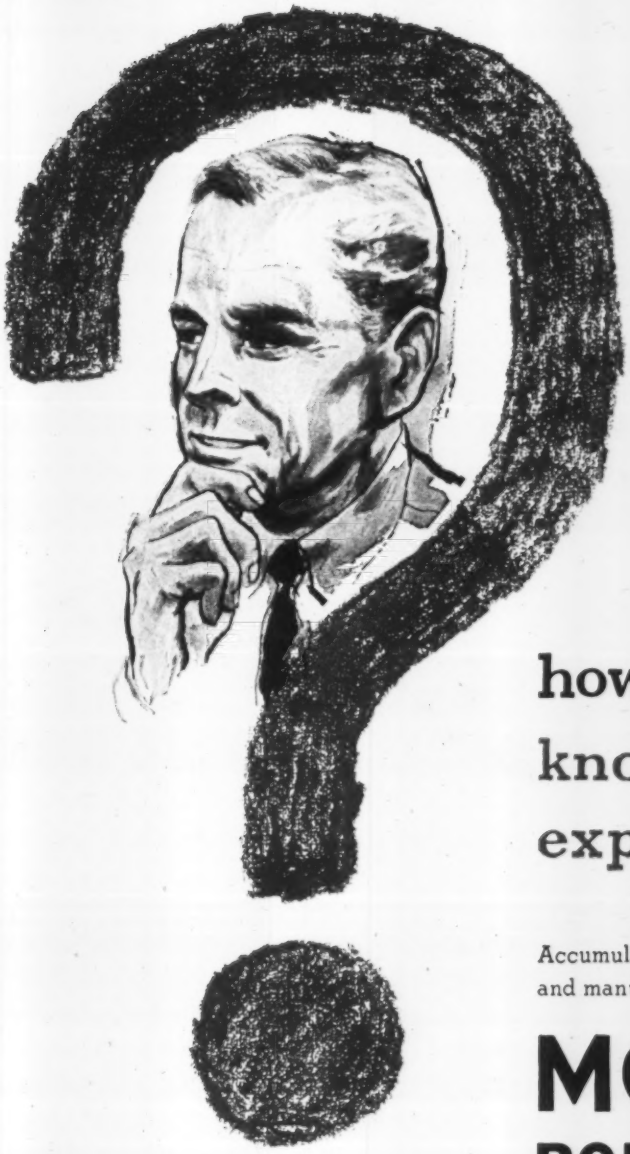
The fabrication work on molybdenum is new. The rocket motor materials research represents a newly integrated project. The other projects have already received some attention in past years or had been covered to some extent by the $70 million set to be spent in fiscal 1960 before the $20 million augmentation was O.K.'d.

Programs receiving the largest share of the $20 million are those for solid propellent rocket motor materials, graphite, and fabrication and processing development.

Materials Committee Looks Ahead

One of the items on the agenda of the next meeting of the Pentagon's Materials Co-ordinating Committee (which has representatives from all services and Pentagon offices interested in materials) will be long range programs in materials research and development for the Army and Navy. The Air Force already has such a program.

The committee also hopes to achieve more effective and efficient control over its programs. Besides the $90 million being spent this fiscal year, it is estimated that $150 million to $200 million is spent annually in materials research through end item contracts held by private industry. The Pentagon wants to identify more readily the work done in the end item contracts. Significance of the Research & Engineering Office's augmented program lies in part in an attempt to minimize the work needed to be done under such contracts. Of course, there will always be materials research and development done under end item contracts, but for purposes of disseminating information and co-ordinating advances, end item work may be less, rather than more, in the future, if the Office of Research and Engineering can continue to get an expanded budget. Naturally, much of the $90 million is done with universities and industry too, although about one-third can be maintained in government laboratories.



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Frasse seamless steel tubes are used for grill rollers—and to house heating elements. Close quality control is a must—I.D. tolerance is held within .0025"... straightness and length are also critical. Frasse has supplied tubing to meet these rigid requirements for years... *with never a single rejection.*

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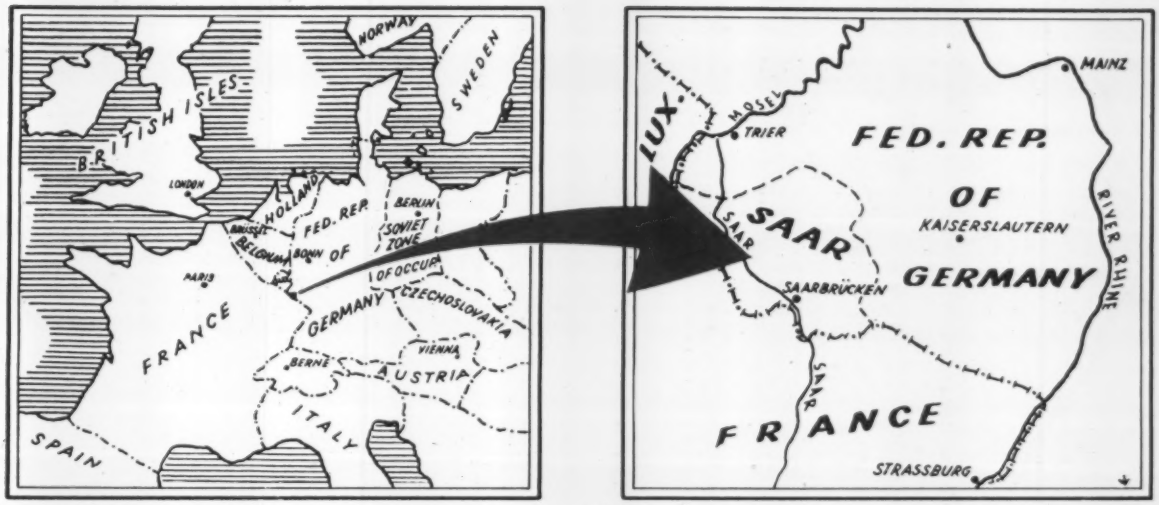


Small in size, but big in economic importance, the Saar is again part of the German economy. To improve the competitive position of the borderland's industry, temporary tax incentives designed to stimulate modernization have been granted by the Federal Republic

The Saar Bounces Back to Germany

THE SAAR BASIN in Western Europe is like a small gold ball—its size belies its value.

One million people live in 991 sq mi. Yet in 1958, the area produced 6 per cent of the European Coal & Steel Community's coal (16.5 million tons), 7 per cent of its steel (3.5 million tons), and 7 per cent of its pig iron (3.1 million tons).

Of the 334,500 employed, 166,000 are in manufacturing, 63,100 in mining, and 44,000 in commerce.

• Today, the Saar is again German.

But like a ball, it has been bounced around quite a bit. In the days of old, the area passed through the hands of many noblemen. Then, in 1801, it became part of France. By 1815, it was Prussian. After the Prussian-Austrian War of 1866, the Saar was aligned with the Northern German Federation which subsequently became part of the German Empire in 1871. The Treaty of Versailles gave France the Saar mining districts as part payment of war reparations after World War I. In 1935, the people voted to be reunited with the Deutschland. After World War II, the region was again detached from Germany to be operated under a system of partial political autonomy. But the economy became French. In 1955, when the Saar voted against a statute providing for a continuation of the existing status, France and Germany agreed to let the Saar join Germany politically as one of the Federal Republic's states. That step was taken in 1957.

The economic link with France was maintained until this year. The link is an important one too. Two-thirds of the Saar's exports go to France, one fourth to Germany. Three fourths of its imports are from France, only one-sixth from Germany.

• With the moving of the Saar's customs barriers from the German border to the French, many far reaching changes are taking place.

The mark has replaced the franc. The German system of taxation is being introduced, although with temporary modifications designed to keep the Saar's economic activity high, safeguarding real incomes and permitting industry to modernize.

Tax incentives, credits, and preferential treatment of the area's products shipped to other German states are being granted. Saar industry has not been modernized since 1948-49. So its goods are at a disadvantage in competing with products from other parts of the Federal Republic. The aid measures are planned for a two year transition period.

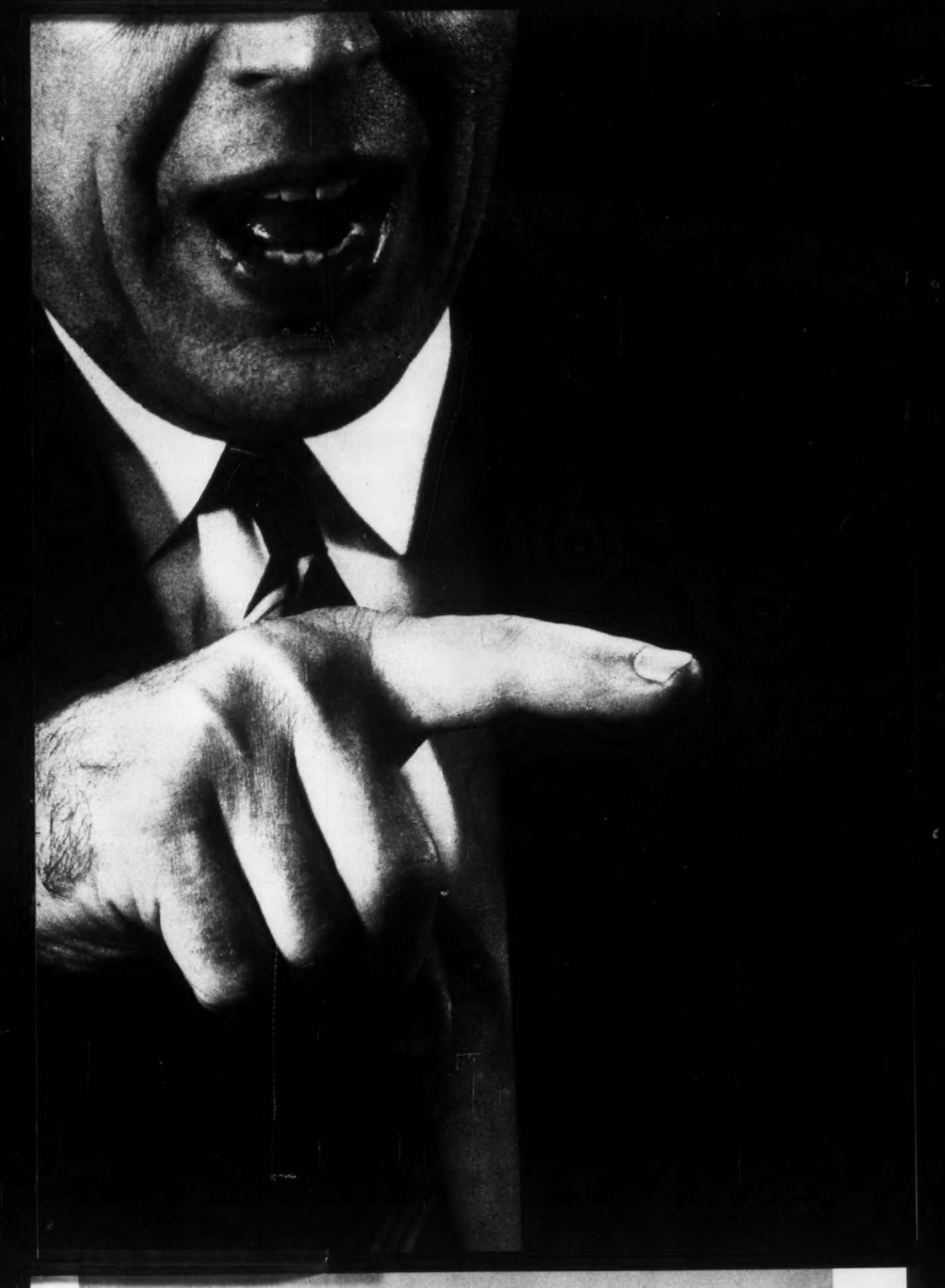
• Provisions are also being made to align the divergence between the French and German wage structures and social security systems.

German wages are higher. The French provide higher family allowances but lower base pay. German wage taxation benefits childless couples more than the French. German old age and sickness benefits are higher.

Except for a temporary increase in consumer goods prices, the carefully planned integration is running smoothly, a sign that the new French-German unity is building a solid foundation for a united Europe.

"...You <u>really</u> pulled the rug out from under me when you fouled up that last delivery!"

This salesman is in trouble. His customer has lost confidence in the company. Even more significant, his customer has lost face. He has been made to look bad in the eyes of his colleagues. His feelings of security have been jeopardized. His get-ahead aspirations have been abused. In other words, he's a *human being* . . . motivated by his *emotions* as well as reason. STEEL's new depth study of *why* metalworking managers buy clearly shows how *fear*, and an amazing variety of emotional factors, affect industrial purchases. For specific suggestions on how you can *apply* these exciting new facts to improve sales and advertising, get in touch with your STEEL representative . . . or drop us a line. **STEEL Magazine, Cleveland 13, Ohio.**



What's Wrong with Job Shops?

• NOTHING that good sound management can't solve.

The conditions listed on the opposite page are improving, as the result of the general economic upturn and better management practices in such industries as foundries, screw machine products, stampings, heat treating, and forgings. A STEEL survey reveals that a large majority of job shop owners and association executives feel that those shops are either participating fully in the recovery or that they will be before the fourth quarter is over (see Page 49).

• Problems Still There — But the problems still exist, most officials believe, and will be just about as troublesome in the next business lull as they were in the last one, unless individual managers do something about them. The problems are not indigenous to these manufacturers, although they tend to view them as peculiar to small shop operations. But where heads-up management has learned to recognize them and act intelligently on them, success has been the rule. For those who haven't—Dun & Bradstreet Inc.'s list of business failures is full of them.

• Too Many Hats — The biggest problem—and the one apparently least recognized by job shop managers—is the concentration of too many jobs in one person. The lack of middle management can be traced to the fact that most of these companies are family affairs. The top man built up his business and is hesitant to delegate his authority to younger, more management-oriented personnel.

The complaint is often heard that small shops can't pay the salaries which hold bright young talent. But management consultants claim that many of these upcomers would like to work in small shops, at least while in the learning process, rather than jump headlong into the rough competition of a multimillion dollar corporation. But the atmosphere must be right.

Biggest problem: Too many jobs for one man

One industry association executive tells of the small Texas jobber who hired a young production control man to study operations and recommend new methods and processes for making the business more efficient. The junior executive worked diligently for a year and a half and came up with a report that eventually would have increased efficiency and profits significantly. The patriarchal president thanked him, filed the report in the bottom drawer, and went on conducting the business as usual. Only the young executive benefited — with another company—which picked up a good production control man.

• Use Available Tools—In STEEL's survey, job shoppers reported the most common problem still is price fighting. The pressure has eased considerably from the fierce competition of the recession days, but there is too much business done at little or no profit, they feel.

What is needed is more complete knowledge of costs, say association executives like Don Workman, executive vice president of the Gray Iron Founders' Society Inc., Cleveland. GIFS has been pushing cost analysis for 31 years. In the last two or three years, at least 25 per cent of the members have conducted formal programs among top production and sales personnel. Despite the success of these seminars, Mr. Workman feels that not enough members take advantage of what their associations have to offer. "Last year, 175 gray iron foundries bit the dust. Some did so voluntarily, but most did not," he comments.

Trade associations also are active in market and technical research. "Some of the best work in these fields is done by associations serving the job shop industries," comments one observer.

"While it can't solve individual problems, it certainly is the basis

Good Job Shop Management Can Solve These Problems:

1. Price fighting—If you know your costs, you're in a better position to meet your competitor's bid.

2. Lack of middle management—Many bright young men prefer small companies with a progressive attitude where top management is willing to delegate authority.

3. Lack of technical knowhow—Intelligent use of even limited resources and co-operation with trade associations can result in special skills.

4. Lack of market research—Both the government and trade associations can be of help if you're smart enough to take advantage of their services.

5. Labor—If your shop practices are modern and atmosphere is pleasant, quantity and quality of workers will improve.

6. Competition from captive and production shops—Special skills, combined with good records on delivery and quality, will help you beat back this competition.

7. Competition from other materials and methods—Good management won't waste time crying, but will find ways to turn such competition to advantage.

8. Overcapacity in the industry—Adequate knowledge of costs and markets will help you determine your own capacity level.

9. Loss of markets through obsolescence or design changes—When you start thinking in terms of profits rather than tonnage, many problems in this area will begin to disappear.

10. Lack of finances—Even though you're small, many banks will back you if your records are up to date and your operations efficient.

11. Profits—If you score well on most of the preceding points, this one will take care of itself.

for further company efforts."

• **Fatalists** — Many job shoppers despair at solving some of their problems, such as depreciation. Orrin B. Werntz, executive vice president of the National Screw Machine Products Association, Cleveland, tells of the shop which was taking a 10 per cent depreciation rate a few years back. Then the government imposed a 6 2/3 per cent rate. Now the government wants to cut it again to 5 per cent and establish a residual value for the used machinery that will lower the depreciation still further. "Congress is still more interested in killing the goose than in collecting the eggs," he declares.

What's Right with Them

Despite their problems, there are many things in favor of the job shops. Most are "vertical" manufacturers, devoting all their efforts to one type of product or process. The really successful ones have developed one special process or technique to set them apart from the rest.

And their schedules are usually more flexible to customer demands than are those of a production or captive shop. Capacity today in most industries is sufficient to handle peak demands. And because there is less red tape in a small company, both order and design changes from customers are handled quickly.

• **Personal Touch**—One of the important intangibles in job shop operations is the personal touch they can give to each order. Many offer special engineering or design help. And closer supervision results in high quality in most cases.

But the biggest thing job shops still have to offer is price. Most figure they can produce a part cheaper than a captive shop because they have lower labor and overhead costs. Combined with quality, specialization, and flexibility, job shops are more than holding their own in the make or buy department.

A few feel that captive shops are increasing their take of the total market, but most believe that the trend is in favor of the job shops. "As much of the captive equipment becomes obsolete, it is being abandoned rather than modernized," claims one screw machine products man.

"The big companies, like the auto or appliance people, create the impression that captive shops are winning, but for every General Motors, there are hundreds of smaller firms who realize they can't do their own work at anywhere near our costs."

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BULLARD

"H.B.M., Model 75 is better than any other machine we've ever seen."

This statement by Mr. John Gruber, Plant Foreman of George Hantscho and Company, Inc., Mount Vernon, New York, manufacturers of printing equipment, sums up their experience since installing the Bullard 4" H.B.M., Model 75, in June 1957.

He further states "our presses and paperfolding machines are made to order and each job varies from the one before it. Because of this, we can't use assembly line or mass production techniques."

"The only mass production we have is the machining of holes in cast iron, up to as many as 105 in a side frame. Since we've been using our Bullard H.B.M., Model 75, with BULLARD AUTOMATIC POSITIONING we have not spoiled a single piece due to the malfunctioning of the machine."

Do you know the full story on the Bullard H.B.M., Model 75? If not, it will pay you to call your nearest Bullard Sales Engineer — he'll be glad to give you all the details or write

THE BULLARD COMPANY BRIDGEPORT 9, CONN.

What Small Cars Will Do to Market Patterns

How They'll Sell in '60

Rambler*	340,000
Corvair	320,000
Falcon	290,000
Valiant	185,000
Lark	145,000
Imports*	500,000
Total	1,780,000

*Doesn't include highest price lines.
Estimated by STEEL.

Their Effect on the Industry

- Present medium price class will be hardest hit.
- Economy automakers will shoot for one-fourth of a 6.9 million car market.
- Chevrolet, Plymouth, Ford will become medium price cars.
- Competition will be measured in narrow price bands instead of broad model groups.
- More than two-thirds of 1960's cars will be sold in $2500 to $4500 price range.

AUTODOM'S traditional method of measuring car sales in four broad price group is passe. There's no longer much difference in quality, style, and size among Fords, Chevrolets, Mercurys, or Dodges. There's also less prestige connected to the name of the car you drive. Result: Buyers are much more interested in price than in brand names.

Next year, many cars will be competing in what once were the low medium and upper medium price classes. These cars (some 28 series) are expected to account for two-thirds of 1960 sales. To pinpoint competition, the industry should start measuring in $100 price increments instead of broad price classes. *Ward's Automotive Reports* has broken down production that way. The results are interesting.

• **Broad Spread** — Last year the largest share of the market (17.8 per cent) was made up of cars costing $2301 to $2400. Another 14.3 per cent was in the $2401 to $2500 price range. Less than 11 per cent of last year's output was priced under $2000. In putting the breakdown to work, it's evident that too broad a price spread may greatly increase competition.

In 1958, Ford Div. built 1.03 million cars, or 24.4 per cent of industry output. Chevrolet accounted for 1.25 million, or 29.5 per cent. Ford cars were priced between $1700 and $3000. Chevrolets listed from $1800 to $2600. There were 3.21 million cars in Chevy's price range. It built 39.6 per cent of them. Ford faced tougher competition. It fought for a slice of 3.67 million cars and wound up with a market penetration of 25.8 per cent. Half a million of the cars in Ford's price group cost more than Chevrolets. It's conceivable that a narrower pricing spread might have helped Ford concentrate its sales efforts and win a larger share of the market.

• **Makes Selling Hard**—Oldsmobile is an even better example. It built 26.6 per cent of the cars in its price range. Contrast that with Buick at 9.4 per cent, Pontiac at 9.6, Mercury and Dodge at 5.4. Says *Ward's*: "Only 1.1 million cars of all makes were sold in Olds's price range. By contrast, 2.75 million cars were sold in Buick's, 2.26 million in Pontiac's, 2.44 million in Dodge's, and 2.46 million in Mercury's. Less competitive pressure pricewise, gave Olds an added sales advantage. It's price spread equaled Mercury's and was narrower than its other competitors."

The introduction of Falcon, Corvair, and Valiant will upgrade Ford, Chevy, and Plymouth even more and put a heavier squeeze on the so-called medium price class cars. To successfully survive in this overcrowded field, it seems likely that

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each division will narrow its prices down so it will compete against fewer models in the same price class. It can use a rifle instead of a shotgun to hit its sales targets.

Preview Notes

Detroit's 1960 models will be introduced in another month. The cars are being previewed by dealers, suppliers, and newsmen. Here are highlights from preview statements given by Cadillac, Oldsmobile, Pontiac, and Buick Divisions of GM.

General Motors is forecasting a 6.9 million car year. Some 500,000 of them will be imported vehicles. That means imports will drop off slightly from 1959's expected sales goal of 600,000 units.

Cadillac Div. is predicting 156,000 sales next year compared with 154,000 this year. James Roche, general manager, adds that Cadillacs are accounting for 63.3 per cent of luxury car sales this year. Although price information has not been released, Mr. Roche points out that Cadillac's last price increase came late in 1957 when the '58 models were introduced. "Since then steel has gone up 3 per cent in price. Aluminum is up 4.5 per cent, zinc up 10 per cent, and wages up 8 per cent," he states. The implication is that prices may have to be increased. Other sources have said that many of the volume lines will be marked up 2.5 to 3 per cent, although prices are apt to stay the same on lower production series.

Jack Wolfram, Oldsmobile's general manager, forecasts a 13 per cent sales increase for his division. He adds that the medium price class is experiencing a sales increase for the first time since 1955. Registrations are up 16 per cent. Mr. Wolfram points out that with the constantly expanding market medium price cars will increase their share of the market numerically. He looks for 80 million cars on the road by 1970.

Pontiac has increased sales 70 per cent over last year's to take second place in GM and first in the medium price market. It has a chance of winning third place in industry sales, behind Ford and Chevrolet. With the addition of a new series, the Venture, Pontiac is shooting for 425,000 sales next year against anticipated deliveries of 405,000 in calendar 1959.

Buick's recently appointed chief, Edward Rollert, points out that Buick sales are 10 per cent higher than they were a year ago. The rounding off of fin tips and the changing of grille designs and instrument panels are improvements that should boost Buick's 1960 sales 20 per cent over the estimated 290,000 cars it will sell this year. Adds Mr. Rollert: "I think the new compact cars will affect the import market far more than they will affect us. There will always be a good market for medium price cars because there will always be some people who will want a better car as they improve their station in life."

Although no GM division has revealed how much steel it has inventoried, each division manager says he has enough steel to start producing new models for dealer showrooms and for sale. With the possible exception of Cadillac, it appears that no GM division has enough steel to completely fill its dealer pipelines. This indicates enough steel to last through mid-October.

Valiant Plans Revealed

Chrysler Corp. is starting to reveal some of the plans for its compact car which will be introduced late this fall. Valiant will be marketed through the Plymouth-De Soto Div. Dealers will be selected on the basis of location and market potential rather than by which other car line they sell.

Objectives Chrysler has aimed for in designing the Valiant are a car that is comfortable for a family of six, with "outstanding" fuel economy and performance. It has luggage capacity for a family weekend trip and is larger than present import cars but smaller than standard American automobiles. The car's name was selected from over 2000 entries. Although Chrysler hasn't officially mentioned it, the company had tried to register Falcon as the name of its car but was nosed out by a few minutes by Ford.

While Valiant is aimed primarily at the U. S. market, Chrysler also will try it out in the export field. The company is reactivating a Detroit assembly plant to handle packaging and shipment of automobile components to its overseas assembly plants. Among the lines to be serviced overseas are Valiant and the Dodge Dart

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
7 Mo. Totals	3,839,380	2,563,365
August		180,447
September		130,460
October		261,701
November		514,152
December		593,920
Total		4,244,045

Week Ended	1959	1958
July 25	124,446	85,519
Aug. 1	122,518	62,846
Aug. 8	108,240	65,614
Aug. 15	72,603	59,677
Aug. 22	32,948†	25,918
Aug. 29	20,000*	16,771

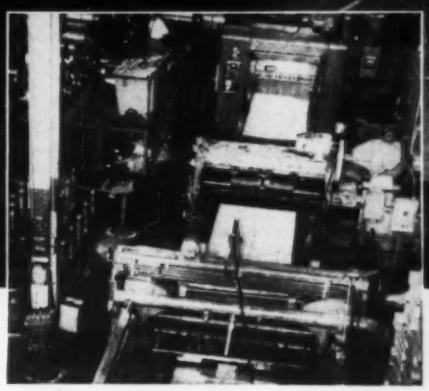
Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

• American Motors Corp., the veteran among U. S. builders of compact cars, previewed its Rambler for the press last week. The other American-made compact, Studebaker-Packard Corp.'s Lark, will have its premier early in the fall.

• Porsche is meeting the compact car threat head on. The German firm is establishing six independent service and distribution centers for its touring and sports cars. It previously marketed its cars through the Hoffman-Porsche Corp., New York. Service usually was handled by Volkswagen dealers because of the design similarities of the two car lines. Last year Porsche marketed 2648 cars in the U. S., or 43 per cent of its production. The company expects to equal that mark in 1959 and '60.

• The UAW reports SUB payments to its members have exceeded $108 million since the program started three years ago. Contributions total about $265 million. The UAW figures there's about $265 million in the various SUB funds.



Edward N. Sienko, Manager of Special Products, tells how:

"Custom service and Wean coil processing are helping Sun Steel beat cost squeeze"

That's a sheet of partially embossed stainless Mr. Sienko is holding—and it's part of the story on how Chicago's Sun Steel Company is countering the cost squeeze on steel warehousing operations.

As Mr. Sienko states it, "Today our margin on materials is half what it was 15 years ago but our man-hour costs are more than double." Sun's answer: add specialty products to better serve customers—such as vinyl-coated steel, embossed stainless and aluminum sheet—and cut costs by installing a Wean coil processing line.

The Wean "Flying Press" line enables Sun to stock standard coils—with savings in cost, handling and inventory—yet meet customer requirements for prime sheet quickly and efficiently. As Mr. Sienko puts it, "To provide this custom service, we need modern equipment like the Wean 'Flying Press' line: we'd be lost without it."

If your firm uses sheet stock in quantity, you should explore the possible economies of coil processing. Write or call for an appointment with an experienced Wean sales engineer: it may be the most important step you'll take this year in the battle against costs.

WEAN EQUIPMENT CORPORATION
CLEVELAND 17, OHIO
Detroit • Chicago • Newark

WEAN

The shipping tag that's more than an address—it's your guarantee of top-quality seamless steel tubing

THE shipping tag above is more than just an address when it's attached to the Timken® seamless steel tubing you buy. It also tells the grade and size of tubing, the heat number and who and what the tubing's to be used for. It all adds up to a guarantee that you're getting top-quality seamless steel tubing—tubing that's tailored for your job.

Backing all this is a whole series of special manufacturing, testing and inspection techniques. For example, the Timken Company has one of the most modern, best-equipped seamless tube mills in the country. Many of the techniques we use are unique in the steel industry. Experts handle every production step—melting, piercing, finishing, testing, final inspection.

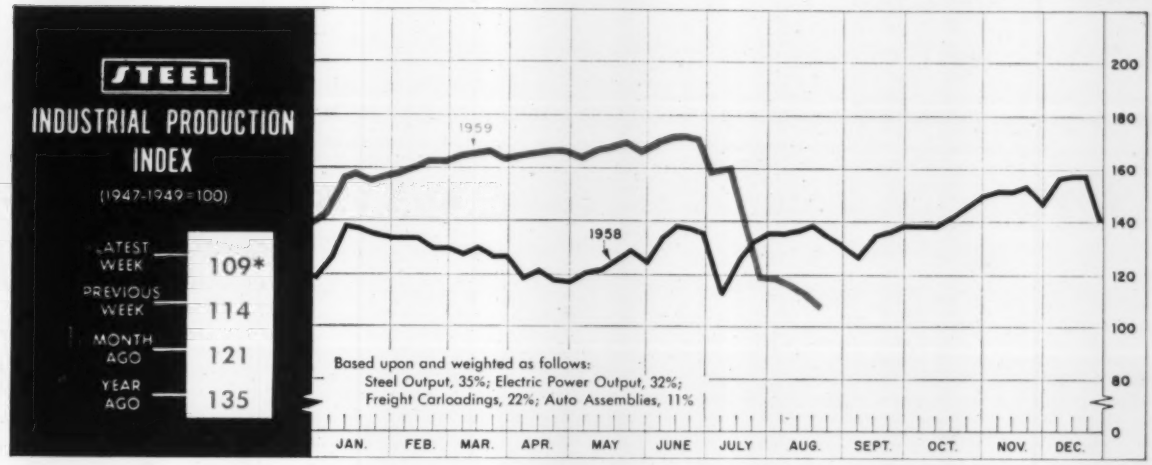
Timken seamless steel tubing is use-proved in hundreds of applications. And Timken Company metallurgical experts are ready to work with you on your seamless steel tubing problems. They'll help you select the one combination of grade, size and condition of tubing best-suited and most economical for your application. For the most for your steel dollar, specify Timken seamless steel tubing. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

WHEN YOU BUY TIMKEN STEEL YOU GET . . .

1. Quality that's uniform from heat to heat, bar to bar, order to order
2. Service from the experts in specialty steels
3. Over 40 years experience in solving tough steel problems

TIMKEN® *Fine Alloy* STEEL

TIMKEN ALLOY STEEL AND SEAMLESS STEEL TUBING ARE AVAILABLE FROM STEEL SERVICE CENTERS IN 44 CITIES IN THE UNITED STATES



*Week ended Aug. 22.

Small Metalworkers' Business Good

WHILE most of the recovery headlines have been grabbed off by the "bigs" in industry, their smaller brothers — partmakers, processors, and other fabricators—have made a quieter but nearly as spectacular comeback.

A majority of the job shop executives reporting to STEEL in a special survey (see Page 42) declare they have participated in the uptrend at least in proportion to the general economy. A few feel they have run ahead of the pack. The small minority which has lagged is optimistic about catching up before the end of the year. A few have qualms about their metal supplies if the steel strike goes too much longer, but most are still in a good position. Imbalance may be a problem soon, but they don't feel this will slow them down too much. With business prospects rosy for two of their biggest customers—autos and appliances—they can see nothing but good times in 1960.

Industry by industry, here is what they tell STEEL.

• **Screw Machine Products** — The industry is in the midsummer letdown, but so far this year it has been running at a near record pace. The monthly shipments index of the National Screw Machine Products Association has averaged 204 (1947-49 = 100) for the first seven months. Last year's average was only 149; in record 1953 it was 228. Orders have averaged 227 per cent of the base period, well above the best previous annual average.

Orrin B. Werntz, executive vice president, says that the industry's dollar backlog as of July 1 was 43 per cent higher than it was on Jan. 1. At the current rate of production it is 8.5 weeks, or 25 per cent better than on Jan. 1.

A Pittsburgh producer says: "We're starting to get more than our share of the business. Our backlog is about double what it was six months ago." Another tells us that while orders are coming in

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	340[1]	321	1,715
Electric Power Distributed (million kw-hr)	13,450[1]	13,648	12,486
Bituminous Coal Output (1,000 tons)	7,150[1]	6,840	8,045
Crude Oil Production (daily avg—1,000 bbl)	6,800[1]	6,823	6,875
Construction Volume (*ENR*—millions)	$377.9	$412.4	$373.0
Auto, Truck Output, U. S., Canada (*Ward's*)	51,373[1]	84,086	38,096
TRADE			
Freight Carloadings (1,000 Cars)	550[1]	544	634
Business Failures (Dun & Bradstreet)	269	274	262
Currency in Circulation (millions)[3]	32,051	$32,071	$31,295
Dept. Store Sales (changes from year ago)[3]	+6%	+9%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,938	$22,051	$22,679
Federal Gross Debt (billions)	$288.3	$288.1	$278.2
Bond Volume, NYSE (millions)	$24.8	$30.3	$24.1
Stocks Sales, NYSE (thousands of shares)	11,762	13,880	12,270
Loans and Investments (billions)[4]	$104.9	$105.1	$94.9
U. S. Govt. Obligations Held (billions)[4]	$29.2	$29.6	$33.7
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	246.65
STEEL's Nonferrous Metal Price Index[6]	220.8	217.7	198.4
All Commodities[7]	119.3	119.2	118.8
Commodities Other than Farm & Foods[7]	128.3	128.4	125.9

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

Any frequency from 0.4 to 10.0 mc/s without tuning, by a simple change of transducers — with the most nearly perfect acoustical "picture" of internal structure obtainable today. And, as with all Branson products, service nationwide is assured at all times. For full information about the all-new SONORAY® Model 5, send the coupon today to Branson Instruments, Inc.

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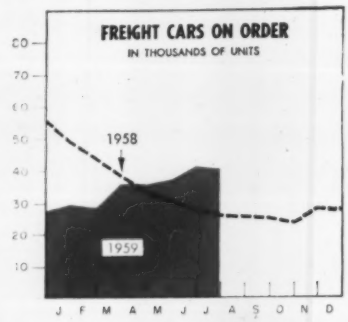
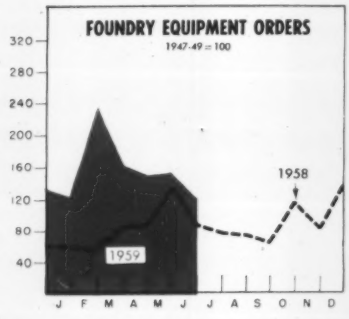
THE BUSINESS TREND





	Awards		Backlogs (end of month)	
	1959	1958	1959	1958
Jan.	4,007	401	29,470	48,787
Feb.	1,806	287	28,789	43,750
Mar.	10,795	193	35,487	38,027
Apr.	3,736	278	35,479	32,908
May	5,253	1,372	36,869	30,386
June	8,054	317	40,973	27,757
July	4,159	376	40,309	25,994
Aug.	....	1,773	.....	25,611
Sept.	....	1,580	.....	24,982
Oct.	....	781	.....	23,670
Nov.	....	6,295	.....	27,962
Dec.	....	3,830	.....	27,596
Total	....	17,481		

American Railway Car Institute.

	1959	1958	1957
Jan.	127.4	57.9	117.9
Feb.	237.1	87.6	188.4
Mar.	166.6	85.9	127.0
Apr.	154.2	88.7	101.1
May	157.0	136.1	136.2
June	125.1	87.7	187.5
July	....	77.9	98.6
Aug.	....	74.1	231.3
Sept.	....	64.5	113.9
Oct.	....	118.9	145.3
Nov.	....	83.3	59.6
Dec.	....	137.0	61.4
Avg	....	89.1	130.7

Foundry Equipment Mfrs. Assn.

Charts copyright, 1959, STEEL.

spasmodically, July's sales volume was about 10 per cent ahead of the figure six months ago.

• **Stampings** — Officials of the Pressed Metal Institute feel that this industry hasn't fully participated in the recovery, but they hope to close the gap before the year is over. Individual stampers are more optimistic. One says: "We've had a terrific improvement—a tremendous first half. Sales were 60 per cent ahead of what we did in the first six months of 1958."

A Chicago job shop says it definitely is keeping up with the general trend and that it's getting a bigger share of the market today than it was four or five years ago. "One-third of our present volume used to be done by captives."

• **Heat Treating**—C. E. Herrington, executive secretary of the Metal Treating Institute, reports that bookings of heat treaters through June were 30.4 per cent ahead of where they were in 1958's first half.

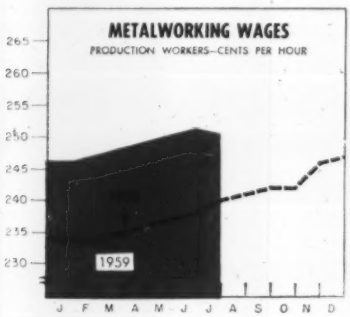
A Pittsburgh shop reports that it did as much business in the first five months of 1959 as it did in the first nine months of last year. "Now things have leveled off at a good, steady rate."

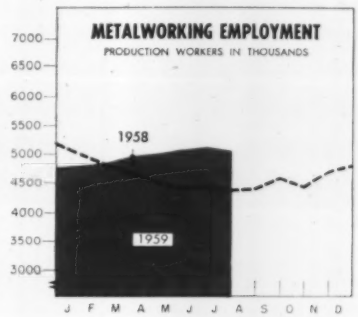
A New York heat treater feels that he hasn't caught up with the rest of his industry, but sales are still higher than they were last year. His chief complaint: "All our orders are for delivery yesterday."

• **Castings**—Most of the companies that haven't felt the uptrend are concentrated in the foundry industry, although even there you find reports of exceptionally good business. The Gray Iron Founders' Society Inc. predicts that shipments this year will hit 13.5 million tons, making it one of the best years on record. Backlogs are at about five weeks. (Four to six weeks is considered normal.)

Don Workman, executive vice president, lists three conditions in the competition with captive foundries: Condition A, where everybody is busy, and captives farm work out to jobbers. Condition B, where business is just good enough to keep both types moderately busy. Condition C, where business is dull, and captives are beating the bushes for extra work. "The industry is passing from B to A right now," he smiles.

But from Chicago comes word to indicate that some jobbers are still in condition C. A foundryman





1958	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
July	268	228	238	215	253
Aug.	270	229	238	214	255
Sept.	272	229	239	216	255
Oct.	274	228	240	215	255
Nov.	275	231	242	218	263
Dec.	275	233	244	219	266
1959					
Jan.	277	232	244	221	262
Feb.	279	233	246	220	262
Mar.	281	235	247	221	263
Apr.	283	235	249	221	263
May	284	237	249	221	264
June	284	238	250	222	266
July	281	238	250	222	265

U. S. Bureau of Labor Statistics.

1958	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
July	852	765	990	712	1.063
Aug.	864	788	977	734	1.034
Sept.	898	822	1,007	762	1,100
Oct.	899	791	1,005	746	992
Nov.	930	827	1.020	788	1,199
Dec.	943	824	1,038	789	1,208
1959					
Jan.	952	820	1.057	791	1,216
Feb.	979	817	1.090	796	1,203
Mar.	1 015	829	1.113	798	1.226
Apr.	1.037	840	1.126	803	1.229
May	1.051	853	1.153	814	1.233
June	1.068	866	1,166	831	1.226
July	1.039	848	1,162	835	1,221

U. S. Bureau of Labor Statistics.

claims: "There just isn't enough work to keep the job shops busy in their own line. The lag behind the economy is about 25 per cent."

Steel founders are feeling the upswing about in line with other small manufacturers. A Pittsburgh foundry president says there has been a definite influx of orders in the last 60 days. A New York producer of alloy steel castings feels that business is not quite what it should be but that it is catching up nicely.

The nonferrous foundries appear to have the best of it in the castings industry. One New York company claims that even though the industry has bounced back faster than most, competition for the big jobs is as tough as ever. "For every good order there are a dozen dogs."

The American Die Casting Institute claims there is no question but what diecasting job shops have bounced back with the rest of the economy. Backlogs are higher than they were six months ago. The biggest problem for small shops in this industry, says ADCI, is the trend toward hot metal contracts in the aluminum industry.

• **Gears**—Through July, gearmakers have been setting a pace second only to the boom years of 1956-57. The monthly sales index of the American Gear Manufacturers Association is averaging 241, just a bit under 1956's 254.4 (1947-49 = 100). Shipments are averaging 215.4, ranking behind both 1956 and 1957.

Durables Indexes Mixed

Most of the producers of major durable goods are still sailing along, although there are scattered indications that the wind is dying down —at least temporarily.

Deliveries of freight cars in July totaled 4273, up from June's 3950, but new orders dipped from the high level of June to 4159. (See table, Page 50.)

Bookings for material handling equipment hit 170.72 (1954 = 100) in June, the highest since June, 1956, reports the Material Handling Institute Inc.

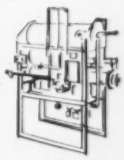
July orders for industrial furnaces totaled $13,141,000, just missing the high of the year set in April, says the Industrial Heating Equipment Association.

Foundry equipment orders fell to the lowest point of the year in June (see chart, Page 50), but that is not considered cause for alarm in this up-and-down industry.

WILLIAM C. DIMAN, Atmosphere Equipment Specialist, reports . . .

MODERN METALS DEMAND MODERN ATMOSPHERES

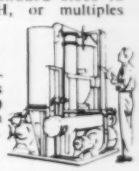
Ever since 1927, when Hayes perfected the first controlled-atmosphere furnace, we have made a steady effort to further the technology of protective atmosphere heat treating. By recommending proper atmosphere equipment, we have helped customers increase production, obtain uniform product quality, and save processing time and trouble. Today, our atmosphere generator line, probably the most comprehensive in the business, includes:



Exothermic Generators . . . for oxidizing or medium-reducing type atmospheres. Standard sizes from 200 CFH to 50,000 CFH.

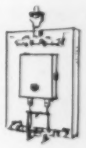
Endothermic Generators — for reducing and carbon potential atmospheres. Standard sizes from 100 CFH to 20,000 CFH.

Ammonia Dissociators — for producing hydrogen-nitrogen atmospheres of high purity and low dew point. Standard sizes to 5,000 CFH, or multiples thereof.



Nitrogen Generators — for 99.99% pure inert gas at less than 20¢ per 1000 cu. ft. Standard sizes from 1,000 CFH to 10,000 CFH.

Forming Gas Generators — for producing controlled ratios of nitrogen and hydrogen from dissociated ammonia. Standard sizes 500 CFH, 1,000 CFH, and larger upon request.



Molecu-Dryer (with LINDE'S Molecular Sieves) — for drying, sweetening, purifying protective atmospheres down to dew points of minus 100° F. Standard sizes from 250 CFH to 6,000 CFH and larger on request.

Hayes offers more than just equipment. Our engineering organization and experimental lab are ready to help make sure you get a "Results Guaranteed" solution to your heat treating or protective atmosphere problem. Write for descriptive bulletins.

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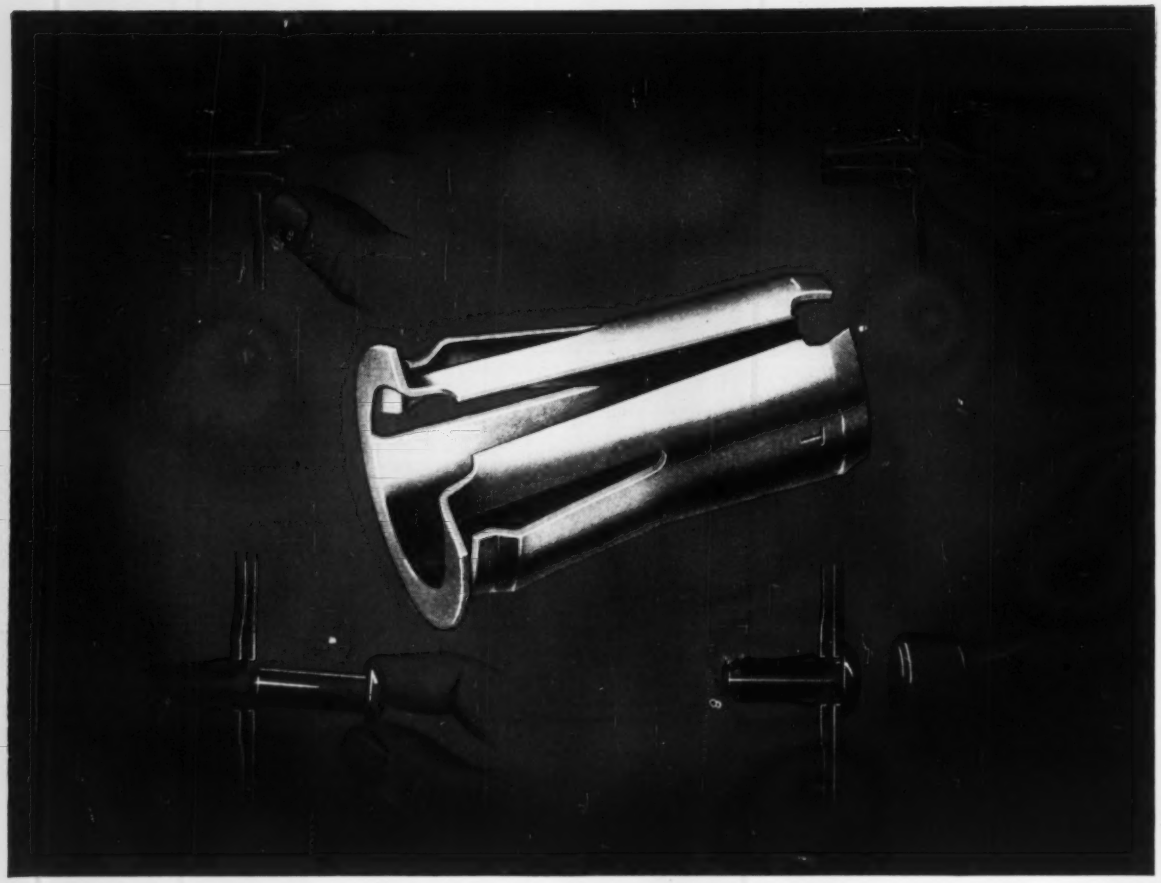

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Cost-cutting Tubular **SPEED CLIP®** takes positive "bite" to hold assemblies tight!

In seconds, you can front-mount trim, name plates, grilles, knobs, insulation, with Tubular SPEED CLIPS. And at interesting savings in assembly time and costs!

Snap these quality spring-steel fasteners into holes in metal, plastic or wood. Then press the mounting studs, nails or rivets into the clips to complete the attachments... anywhere along your assembly line.

As the SPEED CLIP is inserted, spring fingers compress, then expand behind the panel to lock tight. The rolled-in end permits easy entrance, but bites hard into the stud to prevent back-off or vibration-loosening.

Tubular SPEED CLIPS are available for a full range of stud sizes and panel thicknesses. Permanent lock or removable types.

Check your Sweet's Product Design File (Section 8/Ti) for data on Tubular SPEED CLIPS and other SPEED NUT brand fasteners. Then call your Tinnerman representative for samples and additional information. If he isn't listed under "Fasteners" in your Yellow Pages, write to:

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F. E. LEIB
Copperweld vice president

JAMES L. OBERG
heads new M&T Div.

RALPH G. MEHLER
Inland Steel Container v. p.

FRANK C. HAAS
heads Lee Wilson Chem. Div.

F. E. Leib was promoted to vice president in charge of the Wire & Cable Div., Glassport, Pa., **Copperweld Steel Co.** He was general sales manager of the division.

James L. Oberg was named general manager of a newly formed Metals & Minerals Div. of **Metal & Thermit Corp.** The new division is responsible for research, production, sales, and technical service for M&T metals and minerals, and operates mining facilities at Hanover, Va., and mineral milling operations at Carteret, N. J. Mr. Oberg also is a vice president of International Titanium Corp., supervising its operations and those of its subsidiary, Metal Recoveries Proprietary Ltd. in Australia. Reporting to Mr. Oberg are **K. E. Doud,** production manager, and **R. C. Campbell,** product and technical service manager.

Charles Totten was named chief applications engineer to head **Emerson Electric Mfg. Co.'s** new Laundry Equipment Motor Div., St. Louis.

Robert D. Clark was elected executive vice president, **Northern Malleable Iron Co.,** St. Paul. **Donald B. Fulton** was named vice president-manufacturing; **Thomas Kirby** and **John R. Entenmann** vice president and assistant manager-sales, respectively; **Arthur W. Johnson** general superintendent.

Walter M. Cree was elected vice president-sales, **Edgewater Steel Co.,** Pittsburgh. He was general sales manager.

Ralph G. Mehler, superintendent of the 44 in. and 76 in. hot strip mills at the Indiana Harbor Works of Inland Steel Co., was elected vice president in charge of operations of **Inland Steel Container Co.,** a division of Inland Steel Co. **Edward R. Reed** succeeds Mr. Mehler at the strip mills. **John A. Keckich** succeeds Mr. Reed as superintendent of the plant's new No. 3 cold strip mill.

Glenn N. Hackett fills the new post of director of purchases and traffic for **Thompson Ramo Wooldridge Inc.,** Cleveland. He served in a similar capacity for Thompson Products Inc. prior to the merger with Ramo-Wooldridge Corp.

Associated Spring Corp., Bristol, Conn., appointed **John B. Barr** sales manager, Ohio Div., at Dayton; **Donald E. Lake** production manager, Milwaukee Div. Mr. Barr was sales supervisor at the B-G-R Div., Plymouth, Mich. Mr. Lake was sales manager, Ohio Div.

John T. Bachman was appointed a vice president of **Jones & Laughlin Steel Corp.'s** Stainless & Strip Div., Detroit. He was general manager-strip operations.

John N. Allen, district sales manager of **American Brass Co.'s** Cedar Rapids, Iowa, office, was named assistant sales manager, Kenosha, Wis., Div. **Thomas G. Hamilton** succeeds Mr. Allen.

James J. Conroy was made director of industrial relations for **Alan Wood Steel Co.,** Conshohocken, Pa.

Frank C. Haas was named to head the newly formed Chemical Div. of **Lee Wilson Engineering Co. Inc.,** Cleveland. He was vice president of Archer-Daniels-Midland Co.

J. E. Sheets was named eastern sales manager for **LeTourneau-Westinghouse Co.,** Peoria, Ill. He succeeds **D. H. Mitchell,** resigned.

Clarence E. Zettel was made New York district sales manager, **Screw & Bolt Corp. of America.** He was general sales manager of Buffalo Bolt Co.

David A. Mitchell was elected president, **Seaboard Refractories Co.,** Fords, N. J. **Paul von Stein** was made technical sales manager.

James F. Coleman was made manager, Instruments Div., **W. L. Maxson Corp.,** New York.

Nathaniel S. Wilson was named sales manager, **CompuDyne Corp.,** Hatboro, Pa.

C. R. Castor was appointed sales manager for crystal products by **Linde Co.,** a division of Union Carbide Corp. He has headquarters in the crystal products plant at East Chicago, Ind. **N. B. Browne** succeeds Dr. Castor as western sales engineer.

H. B. Wilgus was named general sales manager, appliance and automotive controls sales, **Controls Co. of America,** Schiller Park, Ill. He was vice president-sales and general manager of Electric Products Co., Cleveland, and had been general

GEORGE M. HARGREAVES
Detroit Stamping post

HARVEY E. HENDERSON
Lynchburg Foundry tech. dir.

RICHARD F. PROTIVA
Heil market dev. mgr.

LESTER J. LARISON
American Bridge operations

sales manager of Redmond Co., Owosso, Mich.

George M. Hargreaves was named market and research director, **Detroit Stamping Co.**, Detroit. He has been with American Society of Tool Engineers since 1954.

Harvey E. Henderson was named technical director of **Lynchburg Foundry Co.**, Lynchburg, Va. He was project engineer, Research Dept.

Thomas P. McGough was promoted to district sales manager, Semiconductor Products Dept., **General Electric Co.** His office remains at the department's area sales office in Clifton, N. J.

Motorola Communications & Electronics Inc. established a new sales region on the Pacific Coast, naming **John M. Kobielus** manager. Headquarters are in Los Angeles. The new area covers half of southern California, Arizona, and the southern part of Nevada.

Allan W. McGovern was made Milwaukee district sales manager for **Korhumel Steel & Aluminum Corp. of Wisconsin.**

William P. Uhler was named northeast - central regional sales manager of **Trion Inc.** He is in McKees Rocks, Pa.

C. E. Deardorff joined **Southwestern Industries Inc., Los Angeles**, as chief engineer.

Robert P. Gira was appointed president of **U. S. Science Corp.**, subsidiary of Topp Industries Inc., Los Angeles.

Richard F. Protiva was appointed manager of market development, **Heil Process Equipment Corp.**, Cleveland. He was eastern sales manager. **Robert E. Scheel** was made manager of national branch sales. He was western district manager.

Alva R. Perry Jr. was made manager of **Burroughs Corp.'s** Military Electronic Computer Div., Detroit. Former production manager of the plant, he is succeeded by **L. F. Tree. W. C. Delahanty** was made superintendent of industrial engineering.

Kaiser Aluminum & Chemical Sales Inc. announces sales appointments in its Electrical Conductor Div. whose general sales office has been moved from Chicago to Oakland, Calif.: **R. J. Harrison**, division market sales manager; **E. K. Matteson**, manager of utility sales; **J. G. Johnson**, manager of industrial sales; **J. A. Leuver**, north central regional manager; and **R. L. Kuemmerlein**, Kansas City regional manager.

James G. Hendrick was named director of systems and procedures for **Raytheon Co.**, Waltham, Mass., a new post.

Joseph T. Ryerson & Son Inc., Houston, named **Allan F. Eggleton** sales manager-alloy, stainless, cold finished carbon bars, and tubular steel.

Frank S. Sheppard was made sales manager, **Atkins Hardware Div.**, Atkins Saw Div., Borg-Warner Corp., Indianapolis.

David B. Eden fills the new post of director of distributor sales for **SKF Industries Inc.**, Philadelphia.

Lester J. Larison was appointed manager of operations, **American Bridge Div.**, Pittsburgh, U. S. Steel Corp. **Royce D. Northcutt** was made plant manager at Gary, Ind., to succeed Mr. Larison. Mr. Northcutt was head of the Trenton, N. J., plant.

Richard N. Wells was named Baltimore district sales manager, **Berger Div.**, Republic Steel Corp. He succeeds **R. L. Keiser**, made branch manager for Berger in Philadelphia.

Dr. Charles F. Robinson was made associate director of research, **Consolidated Electrodynamics Corp.**, Pasadena, Calif.

Albert C. Homer, a director of **Eastman Mfg. Co.**, Manitowoc, Wis., assumes full time duties with the concern. He is responsible for organizational planning and development, as well as other duties.

John F. Specht was made general sales manager, **Highway Products Inc.**, Kent, Ohio.

Lawrence R. Gartung, former chief industrial engineer, Aircraft Div., **Eaton Mfg. Co.**, in Battle Creek, Mich., was made chief industrial engineer of the Saginaw, Mich., Div.

Robert W. Dispennett was made Pittsburgh district sales manager, **Aluminum Co. of America.** He succeeds **DuBose Avery**, elected a vice president of Alcoa International Inc., London.

Union Carbide Metals Co., a division of Union Carbide Corp., promoted three to sales managers: **E. F. Helminiak**, Chicago; **Arthur**

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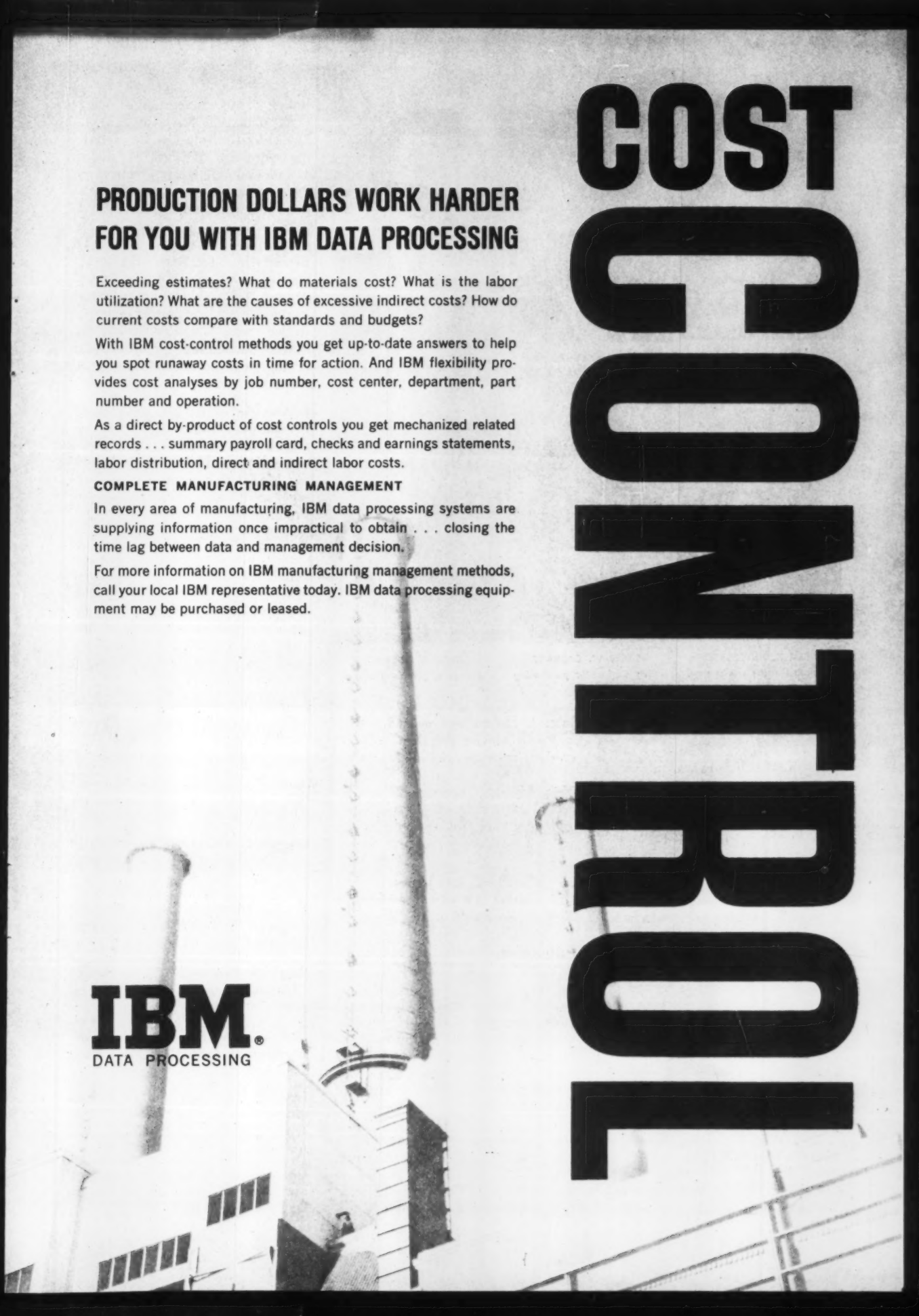

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Wyman-Gordon works mgr.

ROBERT W. CARBARY
Holley Carburetor purchasing

JOHN J. HOBEN
Scovill v. p.-operations

Herbener, Cincinnati; **F. A. Stephens**, Detroit.

Loren K. Hutchinson was promoted to works manager, Worcester, Mass., plant, **Wyman-Gordon Co.**, effective Sept. 1. He joined the company in 1951 as assistant to the executive vice president and in 1953 was made industrial relations manager.

Robert W. Carbary was made director of purchasing, **Holley Carburetor Co.**, Detroit. He has been materials control manager and buyer. **John F. Ter Keurst** was named director of industrial relations and personnel. **Harry T. O'Connor** was recently elected vice president-general manager, Automotive Div.

Darrell V. Jarvis was made assistant district sales manager, Chicago territory, **International Resistance Co.**

John D. Campbell was made manager, Supply Div., **Ferro Corp.**, Cleveland. He succeeds the late **Theodore F. Moeller.**

John J. Hoben was elected to the new post of vice president and operations manager, **Scovill Mfg. Co.**, Waterbury, Conn. He is in charge of production operations in the Scovill Mills Div. for brass copper and aluminum mill products. He was works manager.

H. Follett Hodgkins Jr. returned to his position as vice president of **Rollway Bearing Co. Inc.**, Syracuse, N. Y., after a year of advanced management study at Massachusetts Institute of Technology.

Paul G. Mayer was made general sales manager, **Loewy-Hydropress Div.**, New York, Baldwin-Lima-Hamilton Corp., to succeed **Frederick A. Fielder** who became vice president and general manager of the division.

W. Paul Smith was appointed a vice president of **American Bosch Arma Corp.**, Hempstead, N. Y. He was president of Control Instrument Co., subsidiary of Burroughs Corp.

Robert F. Meyers was named operations manager, Bay City, Mich., Div., **Electric Auto-Lite Co.**, following retirement of **Clark M. Adams** as general manager. **Harold J. Padesky** was made assistant operations manager and **Orville Mickelberg** manager of the Bay City Engineering Laboratory. **Marvin Bendzick** and **Ted Kern** were named assistant engineering managers and **August B. Meyer Jr.** administrative engineer. All appointments are effective Sept. 1. Previously, Mr. Meyers was assistant plant manager in charge of operations for the division.

James M. McTavish was named general purchasing agent, **Commonwealth Services Inc.**, New York, succeeding **J. G. Shanley**, retired. Mr. McTavish was division purchasing agent for Sylvania Electric Products Inc.'s Atomic Energy Div.

William E. Spaulding Jr. was named manager of marketing research for **Rheem Mfg. Co.**, New York. On the corporate staff, he is responsible for marketing research in connection with planning and acquisition activities. He served for seven years with Stanford Research Institute, Menlo Park, Calif.

E. Raymond Filosi was made facilities engineer for **General Electric Co.'s** Foundry Dept., Schenectady, N. Y.

OBITUARIES...

Charles H. Morse, 86, former chairman, **Fairbanks, Morse & Co.**, Chicago, died Aug. 24.

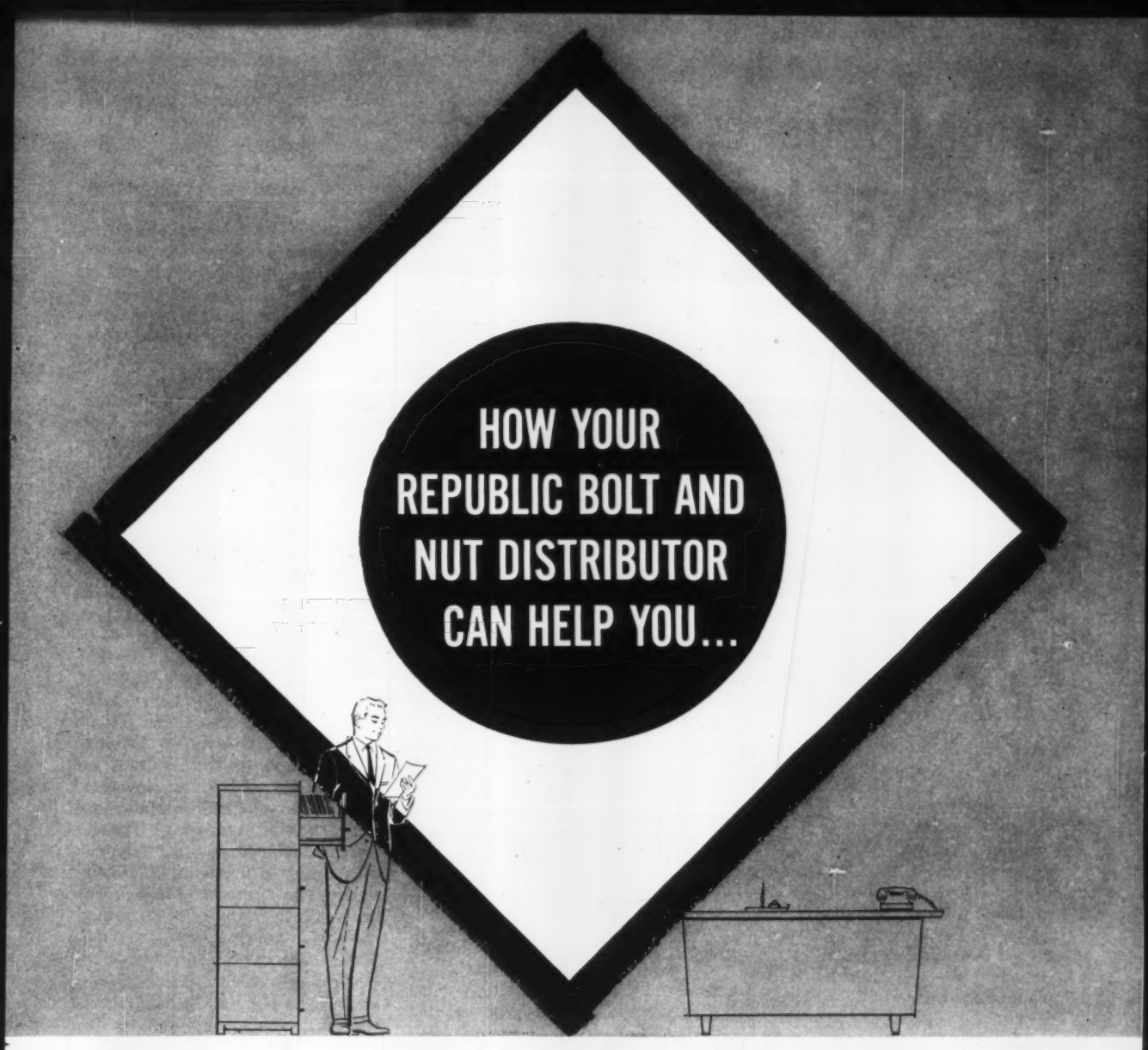
F. B. Stubinger, 58, advertising manager, **Buffalo Forge Co.**, Buffalo, died Aug. 17.

Ralph S. Peirce Jr., 57, co-owner, **Chicago Expansion Bolt Co.**, Chicago, died Aug. 18.

C. C. Conway, 81, retired chairman, **Continental Can Co.**, New York, died Aug. 18.

Ivan H. Anderson, 54, New York district sales manager, Steel & Tubes Div., **Republic Steel Corp.**, died Aug. 18.

Crescent G. Medley, 55, Youngstown district sales manager, **Republic Steel Corp.**, died Aug. 20.



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REPUBLIC STEEL

Steel Continues to Expand In Face of Industry Strike

EXPANSION of the nation's steelmaking capacity is going forward, although construction work underway has been interrupted at plants closed by the strike.

• **Jones & Laughlin Steel Corp.**—A contract for installation of two basic oxygen steelmaking furnaces at the Cleveland Works has been awarded to Koppers Co., Pittsburgh. The furnaces and related equipment will cost about $24 million, part of J&L's $50 million expansion program at Cleveland.

The furnaces will produce 200 ton heats; will have a monthly capacity rate of 100,000 tons of steel ingots; and could be increased ultimately to 140,000 tons a month. They will replace eight 175 ton basic open hearth furnaces which will be dismantled.

The basic oxygen furnaces (only one of which will be in operation at one time) will have 21 ft 8½ in. outside diameter and be 27 ft 10½ in. high. They will be supplied by Pennsylvania Engineering Co., New Castle, Pa. They will be equipped with electrostatic precipitators for smoke control. Construction is scheduled to begin in December, 1959. Completion is planned for early 1961.

Oxygen for the new furnaces will be supplied from a 500 ton a day generating plant furnished by Air Products Inc., Allentown, Pa. Site of the oxygen plant has not been determined.

Another phase of J&L's expansion program at Cleveland includes construction of a blast furnace. Cost: More than $26 million.

• **Republic Steel Corp.**—Mesta Machine Co., Pittsburgh, has been awarded a contract covering the design and manufacture of a 132 in., four high, reversing plate mill and auxiliary equipment for the Gulfsteel Works, Gadsden, Ala. The mill will be designed to roll reheated slabs into plates up to 126 in. wide and to operate as a reversing rougher to produce breakdowns for the hot strip mill. The new equipment will include a vertical edging mill; a 132 in., four high, reversing plate mill with front and rear mill tables, adjustable sideguards, and individually driven tapered rollers for slab turning; a vertical edging mill operating in tandem with the plate mill; and a runout table.

Mesta will provide hydraulic roll balance, descaling, and roll cooling systems, and oil and grease lubricating systems for the plate mill equipment.

• **Crucible Steel Co. of America**—An order for a three-zone slab reheating furnace for stainless, silicon, alloy, and carbon steel, and titanium has been placed with Salem-Brosius Inc., Pittsburgh. The furnace, 85 ft long by 29 ft wide, is rated at 75 tons an hour when heating stainless steel.

• **Inland Steel Co.**—A two-zone pusher type furnace for heating railroad rails and billets has been purchased from Salem-Brosius. Rated at 50 tons an hour, it is 62 ft long by 23 ft wide.

• **U. S. Steel Corp.**—Salem-Brosius also will install a three-zone slab heater in the McDonald Works, Youngstown. It is 74½ ft long by 18 ft wide and will be used to heat carbon steel slabs for rerolling. It is rated at 90 tons an hour.

Alloy steel plate heat treating capacity will be increased at Homestead Steel Works, Munhall, Pa. A second continuous quenching and tempering facility will be installed at the 160 in. plate mill. The new line will require about one year to complete after the start of construction. The line will process alloy steel plates for highly stressed industrial applications and military uses such as missiles, aircraft, submarines, surface ships, and atomic energy equipment.

• **Youngstown Sheet & Tube Co.**—J. L. Mauthe, chairman, says his company will spend $70 million on capital projects in 1959 compared with the $36 million outlay for expansion and modernization of plant and equipment in 1958.

• **Ford Motor Co.**—Salem-Brosius has been awarded a contract for a battery of four soaking pits to be installed at the River Rouge plant, Dearborn, Mich. Each pit will be 25 ft long by 8 ft wide by 14 ft deep. Recuperators to heat combustion air and cover carriage mechanisms for each pit are included.

• **National Steel Corp.** — Ground was broken and construction started Aug. 18 on the plant of Midwest Steel Corp. at Portage, Ind. This is part of National Steel's $300 million expansion program (STEEL, Aug. 3, p. 69). Initial installations at the new mill will include facilities for the production of electrolytic tin plate, galvanized coils and sheets, and hot and cold rolled sheet products.

Contracts for foundation work at Midwest Steel and also for the new 80 in. hot strip mill at Great Lakes Steel Corp.'s Ecorse, Mich., plant were awarded jointly to Eichleay Corp., Pittsburgh, and Walsh Construction Co., Davenport, Iowa.

Salem-Brosius will install four five-zone slab reheating furnaces with a combined hourly productive capacity of 1000 tons of 30 ft long slabs. The furnaces will be used for reheating slabs prior to rolling in Great Lakes's new strip mill (rated capacity: 3.6 million tons of steel coils a year).

Lithium Corp. to Move

Lithium Corp. of America Inc., Minneapolis, plans to move its general offices to the East Coast and its St. Louis Park, Minn., manufacturing facilities, research and development laboratories, and pilot plant to Bessemer City, N. C. The company owns large ore reserves and operates a $7 million lithium chemical plant in that area.

Berry Bearing Builds

Berry Bearing Co. has purchased a building at Michigan Avenue and 26th Street, Chicago, to house administrative and sales offices and to provide a larger area for stocking bearings, bearing specialties, and transmission appliances.

Beryllium Corp. Expands

Beryllium Corp., Reading, Pa., has completed an expansion of its beryllium fabrication facilities at Hazleton, Pa. New plant area of about 12,000 sq ft provides for three separate vacuum hot press furnace installations which will permit production of beryllium metal components in sizes from 6 in. diameter up to about 45 in. diameter by 60 in. long. Sizable increases also have been made in powdermaking equipment. Machine tools for rough machining of components have been installed.

Ex-Cell-O to Move Plant

Machinery building operations of the E. G. Staude Mfg. Co. Inc., a subsidiary of Ex-Cell-O Corp., will move from St. Paul to the Ex-Cell-O plant in Bluffton, Ohio. The move is planned for completion this fall.

To Build Motors in South

Leece-Neville Co., Cleveland, will establish facilities at Gainesville, Ga., for production of the line of alternating current motors recently purchased from O. A. Sutton Co., Wichita, Kans. E. B. Gitchell has been named manager of the division which will start limited production by early fall.

Enlarges Tubing Capacity

Michigan Seamless Tube Co., South Lyon, Mich., will enlarge its manufacturing capacity to handle volume production of its new finned seamless steel tubing. The firm plans to double the capacity of its Texas Div. and raise the corporation's total capacity more than 45 per cent within the coming year.

Builds Research Center

Union Carbide Corp., New York, is constructing a building to house the Union Carbide Research Institute at Eastview (Tarrytown), N. Y. It will be ready for occupancy late in 1960. On the same site, a technical service laboratory which will be used by Union Carbide Chemicals Co. is nearing completion. The institute was formed to complement and extend the scope of the basic research being carried on in the corporation's research laboratories. Programs underway or in the planning stage include study as solid state physics, the theory of metal bonds, and the structure of plastics.

ASSOCIATIONS

National Machine Tool Builders' Association is moving its headquaters from Cleveland to 2139 Wisconsin Ave., Washington, D. C., Sept. 1. Ludlow King is executive vice president.

Officers of the **National Tank Manufacturers Association**, Dallas, include: President, J. E. Ketner, Delta Tank Mfg. Co., Baton Rouge, La.; and vice president, S. O. Weempe, Master Tank & Welding, Dallas.

CONSOLIDATIONS

Standard Pressed Steel Co., Jenkintown, Pa., and **International Electronics Industries Inc.**, Nashville, Tenn., will merge. IEI produces capacitors, including miniature electrolytic types.

American Machine & Metals Inc., East Moline, Ill., purchased the assets of **Automatic Devices Co. Inc.**, Western Springs, Ill., except for the company's plant which it has leased. Automatic Devices makes heating, cooling, and air conditioning controls.

Subject to approval of directors and stockholders, **Avien Inc.**, Woodside, N. Y., will acquire **Luther Mfg. Co.**, North Hollywood, Calif. Avien makes instrumentation systems in the fields of fluids, temperature, and checkout equipment for missiles and aircraft. Luther makes electronic components.

Nixdorff-Krein Mfg. Co., St. Louis, purchased the **Walsh Mfg. Co.**, Charles City, Iowa, manufacturer of farm equipment. Nixdorff-Krein makes industrial chains, tire and tractor chains, wagon and truck box hardware, wire products, athletic equipment, and agricultural equipment.

NEW PLANTS

Chicago Vitreous Corp., a division of Eagle-Picher Co., Cicero, Ill., will build a 50,000 sq ft plant in Paris, Ill., for the manufacture of steel frames, uprights, and trusses. The division makes porcelain enamel material and builds gasoline service stations.

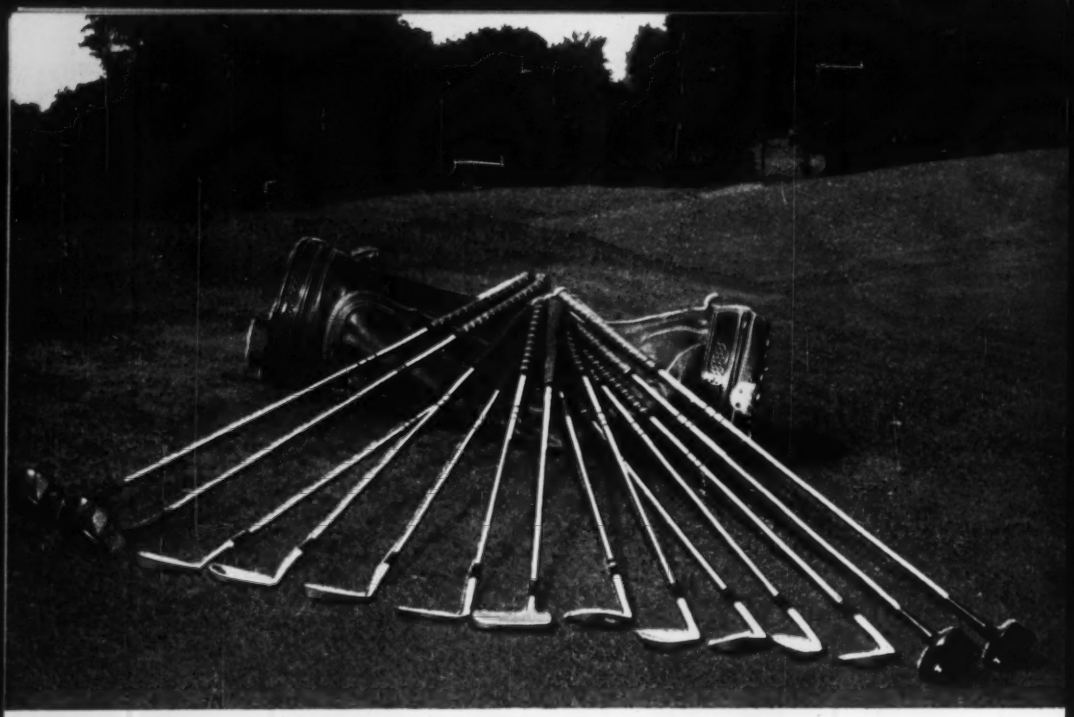
Armco Drainage & Metal Products Inc., a subsidiary of Armco Steel Corp., Middletown, Ohio, will build its fifty-fifth plant at Wallkill, N. Y. The $600,000 facility will produce corrugated metal pipe and pipe arches; plain galvanized, asphalt coated, paved invert, and Smooth-Flo sewer pipe. The building will contain 31,000 sq ft of manufacturing space. Operations will be under the general direction of T. M. Neibling, vice president and manager of the company's Eastern Div., and B. C. Dickey, production supervisor for the division.

American Messer Corp., New York, will build an air separation plant in Richmond, Calif., for **Air Reduction Pacific Co.** Output of the plant will be 30 tons a day of liquid oxygen, nitrogen, and argon. American Messer also built a plant in Vicksburg, Miss., for operation by **Spencer Chemical Co.** Output will consist of 3 million cu ft a month of argon.

NEW ADDRESSES

National Supply Co., Pittsburgh, manufacturer of oil field machinery and equipment, moved its Eastern Div. offices to Columbus, Ohio. Formerly they were at the firm's Toledo, Ohio, plant which is being closed Sept. 30. W. D. Crawford is division manager.

National Cylinder Gas Div., Chemetron Corp., Chicago, moved its Buffalo district office to 396 Grand Island Blvd., Tonawanda, N. Y. NCG produces industrial and medical gases, welding and cutting equipment, inhalation therapy equipment, and other medical apparatus.



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CHROMIUM ALLOYS

Technical Outlook

August 31, 1959

PUZZLER—Pictures taken in some areas show that smog continues unabated during the steel strike shutdowns. Some companies, accused in the past of being major contributors to air pollution, are making the most of the situation. They're confident that when smog control investigators get around to inspecting their plants, they'll find them "cleaner" from a pollution standpoint than was formerly thought possible.

COLD CRUCIBLE FOR INDUCTION MELTS—Elimination of the heating factor in molds used in induction furnaces is the goal of Mallory-Sharon Metals Corp., Niles, Ohio, which is working on the problem for the Air Force. Main metals to be handled will be titanium and other reactive types.

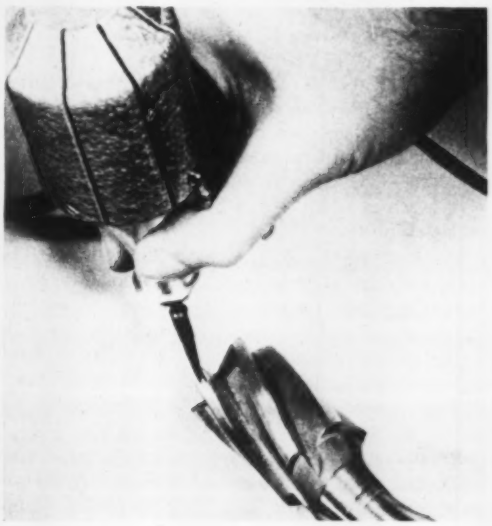
BONDS CAST IRON TO ALUMINUM—It's simple to put cast iron inserts into aluminum die-castings, claims Doehler-Jarvis Div., National Lead Co., Toledo, Ohio (the system is being patented). Cleaning of iron castings uncovers tiny undercuts which are easily filled with molten aluminum during molding cycle. Possible applications: Cast iron brake liners in aluminum brake drums and cylinder liners for car and truck engines.

DENSER POWDERED METALS—More uniform blending and higher bulk density can be obtained with rotary blenders coupled with disintegrators which break up fine agglomerates and fine powders (less than 325 mesh). One test showed that bulk density was increased from 157 lb per cubic foot to 180. Finished products were noticeably stronger too.

CUTTING FRICTION WEAR—Solid molybdenum or vanadium slippers last far longer than other materials on rocket sleds (they travel on rails at better than 1800 mph), states Stanford Research Institute, Menlo Park, Calif. Molybdenum is yet too brittle (some 30 per cent break) so vanadium, which doesn't last quite as long, is being used until an improved molybdenum can be developed.

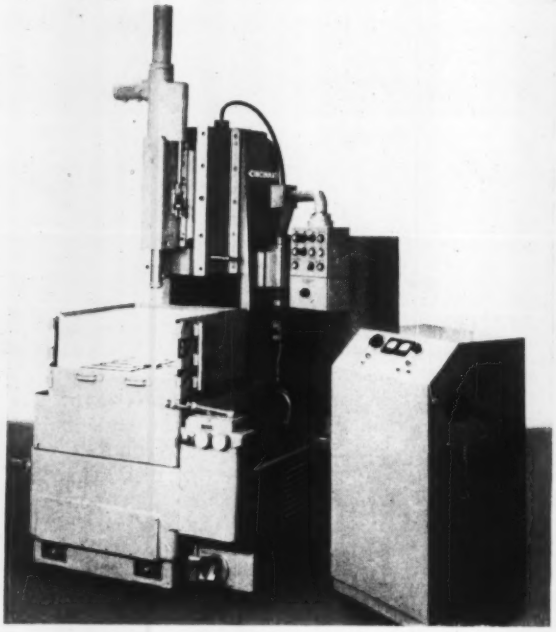
ZINC GAINS—Today's autos are using more zinc than their predecessors because of the metal's improved appearance, claims the American Zinc Institute, New York. Much of the credit is given to Battelle Memorial Institute, Columbus, Ohio, because of its major plating innovations.

IMPROVED CHROMIUM PLATE—A new process for depositing a level undercoating of copper on metal upgrades the appearance of chromium by hiding tiny imperfections and polish marks, claims E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. It developed the process.



THIS SPARKING DEVICE trebles tool life and then some. That's the claim for tool edges impregnated this way. OK Tool Co. Inc., Milford, N. H., says it lays down coarse or fine layers of carbide from 0.0005 to 0.003 in. thick and seems to work on everything from drills to stress sections on extrusion dies. Operating costs are insignificant, the firm adds

Family of Spark Machines Unveiled



This is one possible Elektrojet option. It uses the standard base and column with a drop front tank, nonrotating workhead, and movable slide

All of them (33) utilize standardized building block units. Main market areas will be in diesinking, odd shaped holes, and the "unmachinable" metals

ELECTRICAL discharge is a conventional machining method which needs its own standard machine tools, believe engineers at Cincinnati Milling Machine Co., Cincinnati. So they have come up with a completely new machine line.

Putting the building block concept to work, they have developed 16 basic units that can be assembled into 33 machine combinations. The units include two bases, two slides, four workheads, four base tanks, and four power supplies.

• **Process Refinements**—The company says its machines offer some basic improvements in spark machining (a shower of sparks is used to erode the workpiece).

One is a more sophisticated control of the machining power, producing sparks at a balanced energy level and frequency (10,000 to 250,000 cycles a second) that combine to give a precise, fine finish with a high rate of stock removal. (For more on electromachining, see STEEL, Aug. 24, p. 80.)

Another refinement: Improved machine design with strength and rigidity to maintain precise alignment of tool and workpiece against the pressures of oil being forced through the 0.001 in. gap.

• **Options** — The basic Elektrojet line consists of a single base and column on which may be mounted four interchangeable workheads and four different base-tank units.

The workheads are:

Nonrotating, for operations like diesinking, in which the desired shape is produced by vertical feed.

Rotating, for operations in which a revolving electrode is desirable. (Rotating the electrode as it feeds into the work generally helps boost removal rates, the company reports.)

Universal, in which quill feed and rotation are provided, and the spindle can be rotated in a planetary fashion so precise holes can be drilled with an electrode smaller than the holes—this simplifies the machining of internal contours and annular grooves.

Ram type, for extra large plunging cuts, typical of those required in making large forging and drawing dies.

Each of the workheads can be matched with any of these tanks to hold the electrode:

Solid tank, for small, easily clamped workpieces machined in production quantities.

Open-front tank, for greater accessibility.

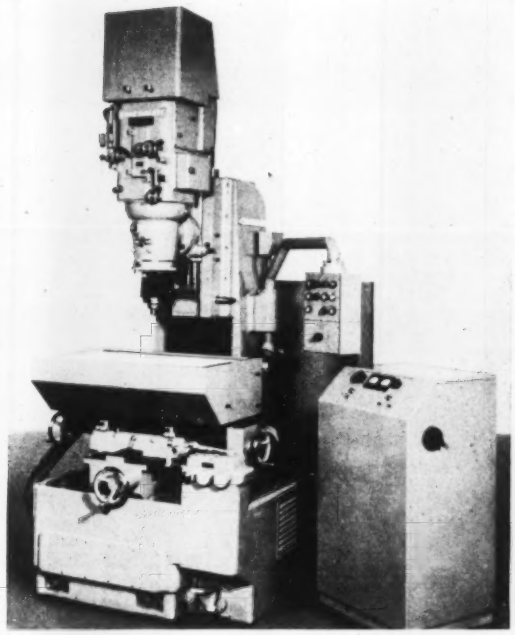
Disappearing tank, in which the whole tank can be lowered into the bed of the machine, making the workpiece accessible from all sides.

Moving table tank, making it easy to locate the part under the electrode, or to move it under the electrode at a controlled rate.

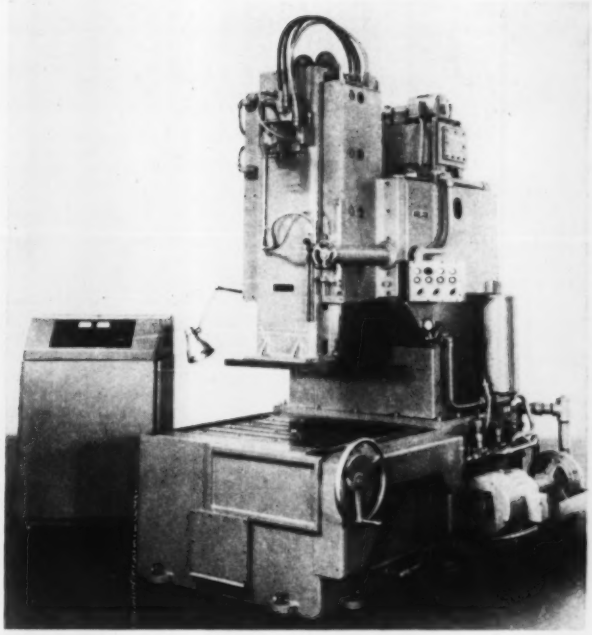
Fixed and adjustable workhead slides are also offered, and the power supply can be chosen from 20, 40, 60, and 100 ampere units.

The line is rounded out by two electrical discharge grinding machines and a heavy duty electrospark diesinking machine. The diesinker is built with a larger base and column than the basic line. It has a ram type workhead, disappearing tank, and is designed for heavy duty diework.

• **Market Goals**—Where will the machines be used? Cincinnati Mill-



A second option uses the same base and column that the machine at left did, but this one has a movable tank, coupled with a universal workhead



This is the large diesinking machine, equipped with heavy duty, ram type workhead and a tank that disappears into the base

ing thinks four areas have good potential:

1. For unmachinable die materials, electrical discharge machining stands alone. On conventional materials, spark machining should be carefully compared with conventional diesinking techniques.

2. The process has a "wide open field" for producing holes with other than circular cross section.

3. It has great potential for jobs where problems of distortion, burrs, and differential heating are created by conventional machining.

4. It will continue to shine with materials that are too hard or two brittle to machine by others means.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Electrodes Are Diecast

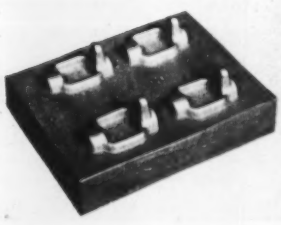
CINCINNATI Milling's researchers worked on the problem of machining rates and tool wear. Result: A method of producing this type of diecast tin-zinc electrode. The company says it is efficient and economical enough to permit any die shop to apply it.

Other improvements:

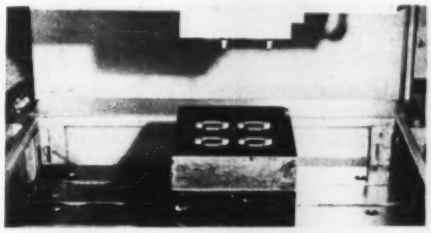
• **Close Tolerances**—The new line of machines is designed to produce bottom corner radiuses as small as 0.002 in. and 0.008 in. at regular production speeds. A hole only 0.00003 in. out of round has been produced experimentally. Large die cavities are being sunk with dimensional accuracy of ± 0.005 in.

• **Work Size**—Upper limits of cavity size have been raised by techniques for making large, inexpensive electrodes and by development of heavy duty machines which are precise, the company claims. Cavities of 50 cu in. can be machined at removal rates of 0.018 cu in. a minute.

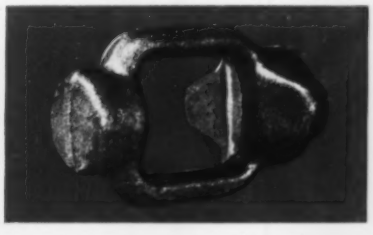
Forging die electrode is diecast

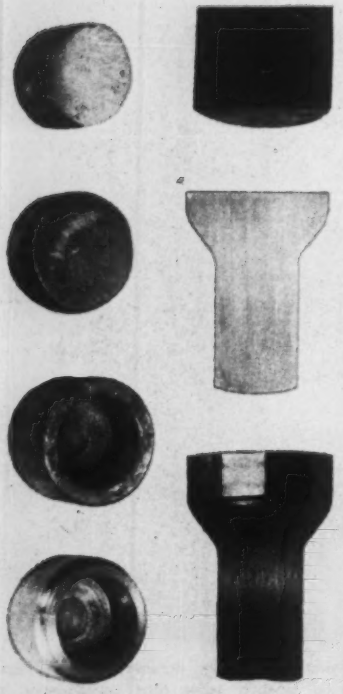


Here, the electrode sinks contoured die

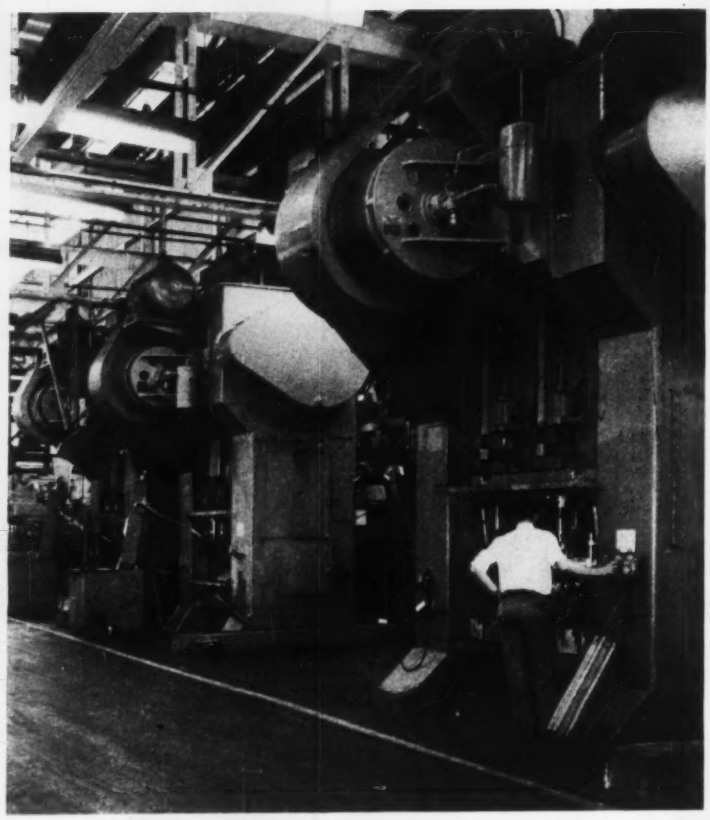


This part was forged in the die





Progressive steps in making a bearing race (left) and propeller shaft end (right)



These three Verson presses extrude bearing races and propeller shaft ends at Chevrolet in Cleveland. Two of the presses can produce about 5600 races an hour. The other turns out 720 to 750 shaft ends an hour

Extrusion Helps Hold the Cost Line

At Chevrolet Stamping Plant in Cleveland, three presses are squeezing out bearing races and propeller shaft ends with substantial savings in material costs

COLD EXTRUSION is helping automakers build a better product at less cost.

The chipless forming method allows fabricators to use less costly materials in many cases, reduces material consumption, cuts down on machining requirements, and lowers material handling costs.

The Chevrolet Stamping Plant, Cleveland, has installed three Verson extrusion presses to extrude bearing races for the universal joint yoke trunnion in General Motors cars and trucks, and the propeller shaft end, also a part of the universal joint.

• The Chevrolet plant has reduced the amount of material used on the parts and has been able to use lower cost steel.

Bearing races formerly were made of 1018 and 1024 steel. Now they are extruded from 1016 material. An extrusion slug weighs only 40 per cent of the screw machine blank.

The propeller shaft ends are made from 1045 steel when they are forged. As an extrusion, they can be made in 1035. Material saving on this part is less spectacular; George Engelmann, master mechanic, estimates it to be about one-fifth of a pound.

• Two 400-ton Verson presses are used in the production of the bearing races.

The stamping plant also maintains a battery of Conomatic multiple spindle bar machines to turn

out bearing races. They supplement the production from the two presses which extrude about 5600 parts an hour.

There are two sizes of bearing races. One starts as ¾ in. diameter coil stock. It is cut off and formed into 1-1/16 in. diameter slugs in a cold header. The other race starts as ⅞ in. diameter bar stock, is cut off and headed into 1⅛ in. diameter slugs. Before extrusion, the slugs are annealed and phosphate coated.

• Two races are extruded at one time in an eight-station indexing die.

Station one is a loading station. Slugs drop from a chute into the die. At station two, they are extruded. At station three, a probe checks to make sure the punch hasn't broken off in the die. Station four is knockout and unload.

The races are extruded with carbide punches and steel dies. Carbide knockout pins are used.

The indexing die plate is positively driven from the press so it will always be aligned during the downstroke. Any misalignment, punch breakage, wrong size slug, or slug ejection failure will stop the press.

Verson Allsteel Press Co., Chicago, built the tooling as well as the press.

Finish operations on the extruded bearing races include grinding of the closed end of the race, the open face, the outside diameter completely, and the inside diameter.

When the races are made on screw machines, the blank weighs 0.211 lb, of which 0.13 lb is machined off. It starts with 1⅛ in. diameter bar.

After rough machining on Conomatics, the turned races are finished in the same way as the extruded ones.

• All the propeller shaft ends are extruded on a 600 ton Verson press at the Chevrolet plant. Production is 720 to 750 an hour.

The extrusion blanks are sawed to length from bar stock, the outside diameters ground on a centerless grinder, and both ends chamfered. After a phosphate coating, they are ready for extrusion.

The propeller shaft ends are made in a six-station indexing die. The first station is a loading station. In the second, the slug is forward extruded to form a shaft on which a spline will be cut. Stations three and four are idle. In the fifth station, the part is backward extruded to form a hexagonal socket on the opposite end of the part. The shaft end is unloaded at station six.

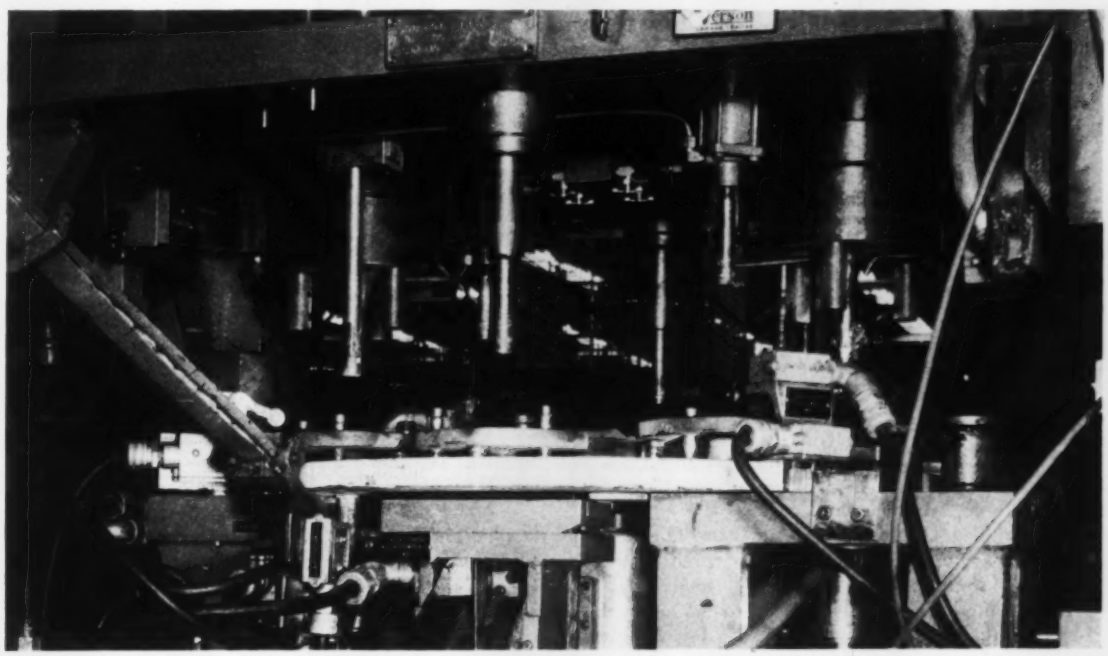
Finish machining includes turning the spline diameter and shoulder, drilling and tapping a hole in the end of the part, hobbing the splines and chamfering the teeth, and finish grinding the spline diameter.

When propeller shaft ends are made by forging, the machining operations are essentially the same as when they are extruded. One area of savings comes in elimination of induction hardening and quenching of the spline before finish grinding.

The extrusion process, in working the metal under 600 tons pressure, hardens it sufficiently to make the heat treat unnecessary.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Tooling setup for extruding bearing races. An eight-station indexing die is used. Phosphate coated slugs drop into the die automatically, and are carried through extrude, probe check, and knockout stations. Two races are extruded at one time



Chip Problem Is Eliminated With Central Vacuum System

Fixture and drill bushings on a multiple boring machine at a laundry appliance plant were choked by chips. A central collecting system was installed. Results: Choking and premature failure of bushings disappeared. The machine does a better job on precision parts

Four nozzles pick up chips and dust as fast as they're produced by this 36 spindle Natco machine (left), preventing excessive drill bushing wear. Separator tanks and vacuum equipment (right) are isolated from the machine

IMMEDIATE removal of dust and chips from machine tools, an important job in any machine shop, can be handled automatically with a central vacuum cleaning system.

Such a system has been installed at Easy Laundry Appliances Div., Murray Mfg. Co., Syracuse, N. Y. Equipment was supplied by Lamson Corp., Syracuse, N. Y.

• The company retooled and began production of a new laundry equipment line. Tolerances were harder to meet than anticipated; breakdowns were excessive.

Special emphasis was placed on tools that could be used by unskilled operators for precision work. An eight station fixture was designed for a 36 spindle Natco machine to drill, ream, and counterbore a gray iron crank arm, a gear sector, and a connecting rod to tolerances of 0.0005 in. The top plate of the fixture was attached to the drill head, so the fixture would open and close automatically. That made extremely long drill bushings necessary.

Before the first run of parts was finished, production bottlenecks were noticed. The run wasn't on schedule, parts weren't within tolerance, and breakdowns occurred more frequently than expected.

• Chips and dust choked tools and drill bushings, causing premature failure.

Chips, following the flutes on the tools, were collecting on the fixture top plate. Cleaning methods used at that time moved chips from one part of the fixture to another. They eventually landed on the machine bed, or on the floor.

Bushings began to wear excessively. That prevented the machine from turning out precision work. Tools often seized in the bushings and broke, or caused bushings to spin in the fixture.

• Problems vanished with installation of a vacuum system that picks up chips and dust before they accumulate.

Tool wear and breakage have been reduced, and machining tolerances are being met easily. Bushings no longer spin in the fixture; downtime for repairs has been almost eliminated.

Less time is required for cleaning the fixture between operations. That increases machine productivity.

• The system is powerful enough to serve additional machines.

Material is drawn through four nozzles; three are fixed; one is movable.

Only the nozzles and tubes are in the scrap collection area. The rest of the system is some distance from the machines. Separator tanks are large enough to hold all chips and dust collected between scheduled machine shutdowns.

Automatic Submerged Arc Speeds Welding Fivefold

A change to automatic submerged arcwelding increased production 500 per cent at R. L. Faubion Co., Kansas City, Mo. It also improved appearance of the firm's products. Orders from distributors have tripled.

The company makes fuel and pressure tanks, and propane or gasoline trucktrailers and tanktrailers.

A few months ago, Faubion switched to automatic submerged arcwelding for fabricating 300 gallon tanks made from 12 and 14 gage steel.

Here's the picture now: Welding speed is 90 in. per minute on both the longitudinal and circumferential lap seams. One operator produces 45 tanks per 8 hour day (almost six times his previous rate).

The smooth, uniform welds require little postweld preparation prior to painting. The amount of leaks is less than 10 per cent of the previous total. That has drastically cut costly repairwork.

Three welding machines are used. Each is equipped with a Unionmelt EH-2 welding head, UCC-3 controls, and a constant potential power source. Welds are made with a current of 400 amperes, 28 volts, using Unionmelt No. 50 welding composition and Oxweld No. 29 wire.

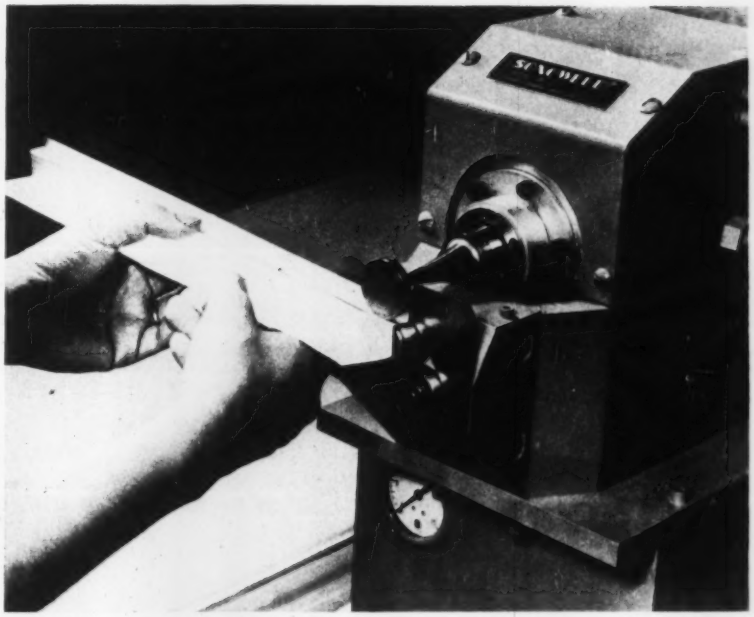
Stainless Steel Impellers Resist Caustic Solutions

Stainless steel pump impellers have operated efficiently for nine years in chemical pulp processing at Mead Corp.'s Kingsport Div., Kingsport, Tenn.

The cast units (alloy Type CF-8M) successfully resist high flow rates and prevent impeller erosion through high velocity impingement. The impellers show no signs of corrosive attack or wear.

Mead standardized on the alloy to resist the corrosive solutions handled in alkali recovery pumping operations.

Processing is done by the soda method. Chips are treated with an aqueous solution of sodium hydroxide. Pumps move the caustic solutions through different processing steps.



This ultrasonic seamwelder manages aluminum sheet up to 0.010 in. thick at speeds over 30 ipm. Beneficiaries are canmakers, automakers, and the electrical industry

Ultrasonics Gain Speed In Joining Thin Aluminum

THE LATEST advance in high speed ultrasonic seamwelding of aluminum holds special promise for container and packaging people, claims Aluminum Co. of America, Pittsburgh.

With it, sheets and foil from 0.006 to 0.010 in. thick are seamwelded at speeds above 30 fpm (on thinner stock, the speed has exceeded 100 fpm repeatedly). The machinemaker, Aeroprojects Inc., West Chester, Pa., indicates it will soon double that rate.

Alcoa claims that the packaging industry, auto radiator makers, and the electrical industry are running projects seeking to adapt ultrasonic welding to their needs to get more production and cut costs.

• Ways for aluminum to compete more successfully with established methods and materials are continually being sought.

An interesting feature of ultrasonic seamwelds is that they can be stopped and started without producing long start-up sections of inferior quality. The seams are leaktight even by helium standards.

Alcoa believes that that feature of ultrasonic welding holds great promise and is the answer to a more vigorous campaign to replace the conventionally soldered steel can. It also believes that an ultrasonic weld is smoother, cleaner, and stronger than the cemented side seams now used in aluminum canmaking.

• Continued development is expected to solve the problem of welding the heavier gages.

At the most, regular strip requires only a moderate cleaning, says Aeroprojects. Degreasing is adequate in most cases. In addition, such devices (called Sonoweld) use low power equipment—line demand is less than 4 kilowatts for the kind of seamwelding being done.

Tongs Move Coiled Strip Easily, Without Damage

COILED ALUMINUM strip is handled quickly and carefully with vertical coil tongs at the Ravenswood Works of Kaiser Aluminum & Chemical Corp., near Ravenswood, W. Va.

The coils are picked up one at a time from the inspection conveyor and tiered three or four high for packaging and shipping. Careful handling is essential.

• **Coil Pickup**—The tongs are lowered with their levers latched and with the gripping shoes at a preset position to allow clearance for the coil wall. When the tongs rest on the coil, the operator pulls the frame toward him until the fixed inner shoe makes contact against the inner diameter of the coil. Next, he pushes the outer shoe against the outside diameter, where it is held by a ratchet. The tongs are then ready to lift the load.

Raising the tongs releases the levers and causes the shoes to grip the coil firmly, but without damage. After the coil is moved, the operator lowers the tongs to bring the levers to the latched position again. Then he lifts the pawl of the ratchet and withdraws the outer shoe to allow removal of the tongs.

The under surface of the tongs frame is lined to protect the coil. Use of shoe adapters for different inside diameters insures holding coils level during lifting.

The tongs (made by Materials Handling Div., Heppenstall Co., New Brighton, Pa.) will handle a range of coil sizes. Quick adjustments can be made for outside diameters from 25 to 40 in. and for inside diameters from 3 to 8 in. Maximum height in operation is 27 in. Load limit is 1000 lb.

Neoprene Machine Mounts Cut Relocation Costs

Rubber isolation mounts helped prevent production interruptions when 86 heavy duty machine tools had to be relocated at the U. S. Naval Engineering Experiment Station, Annapolis, Md. Cost of the move was 87 per cent below the original estimate.

• **Background**—The station's machine shop building was structurally unserviceable. Estimated cost of a move to a temporary location was $103,000. Comparable costs were anticipated again when the machine shop would occupy a new building.

Vibration dampening neoprene mounts were specified. The mounts (recommended by Barry Controls Inc., Watertown, Mass.) eliminated the need for heavy foundations and conventional holding methods.

• **Moving** — The only advance preparation was installation of bus ducts to supply electrical service. Mechanics assigned to each machine were responsible for disconnecting and moving the machine, installing the isolation mounts, and setting up the machine. They were leveled as soon as they were in place. Each mount has an adjustment bolt for leveling.

It was possible to move a 4 ft boring mill weighing over 40,000 lb, place it in position, level it, complete electrical connections, and start operations within 6 hours.

After six months, inspection of the machines showed no significant misalignment or any moving or walking of machines.

This technique makes it possible to position machinery easily to meet changing conditions. One example was moving a 70,000 lb openside planer about 6 ft to make more space for a mill line. The job was done in an hour.

• **Other Advantages**—Isolation of machinery from external vibration can raise production quality on metalworking machines and permit faster operation of equipment such as punch presses. Reduced vibration can cut noise, operator fatigue, and building damage and maintenance.

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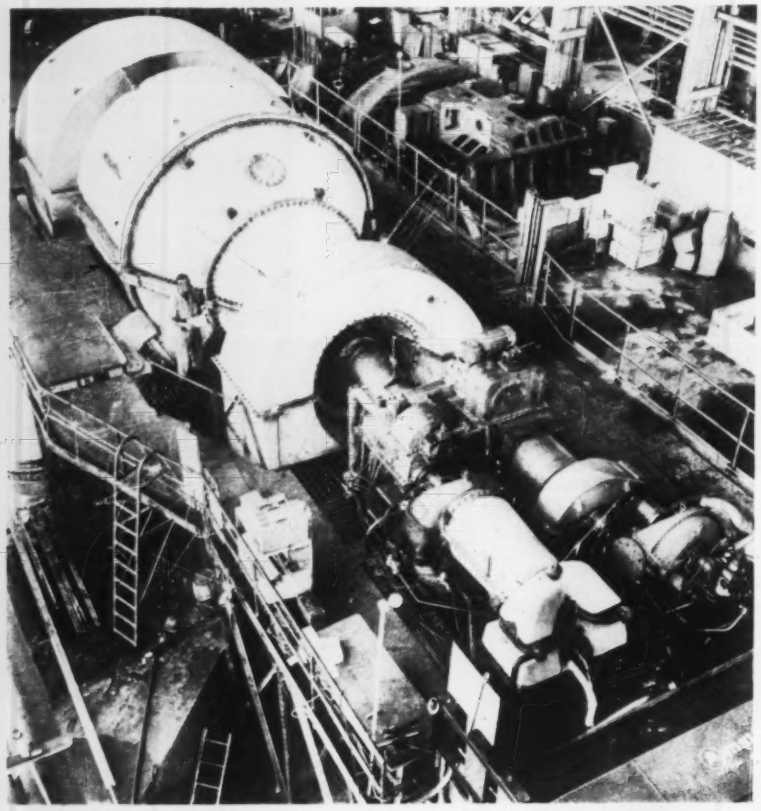
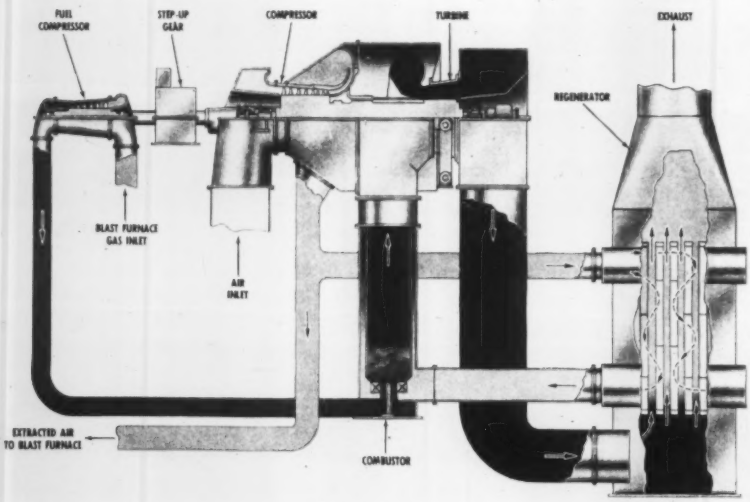
Big Gas Turbine Blows Blast Furnaces



Big blower is given its final check at the factory before it's shipped to the steel mill. Test simulates blast furnace blowing

Fuel is compressed and combined with preheated air in the combustor. Expanding gases drive the turbine, then enter the regenerator to help heat air



STEELMAKERS expect to save on capital expenditures and blast furnace operating costs by using gas turbines as blowers. They'll use blast furnace gas (a hard to dispose of byproduct) for fuel.

A gas turbine system is ready for installation at South Works, United States Steel Corp., Chicago. The 125,000 cfm unit was produced by the Industrial Gas Turbine Dept., Westinghouse Electric Corp., Lester, Pa.

• Research showed that the turbine is superior to present blowing methods.

Capital outlay for the system is well below that for other units of the same capacity. It doesn't require a boiler; water is used only to cool lubricating oil. That could be done with air. That makes it easier to install in the blast furnace area.

The turbine runs efficiently on blast furnace gas, which has a heating value of about 90 Btu per cu ft vs. 1000 for natural gas.

Maintenance costs are low. Noncorrosive blast furnace gas doesn't wear turbine blades rapidly. They're said to last 30,000 operating hours.

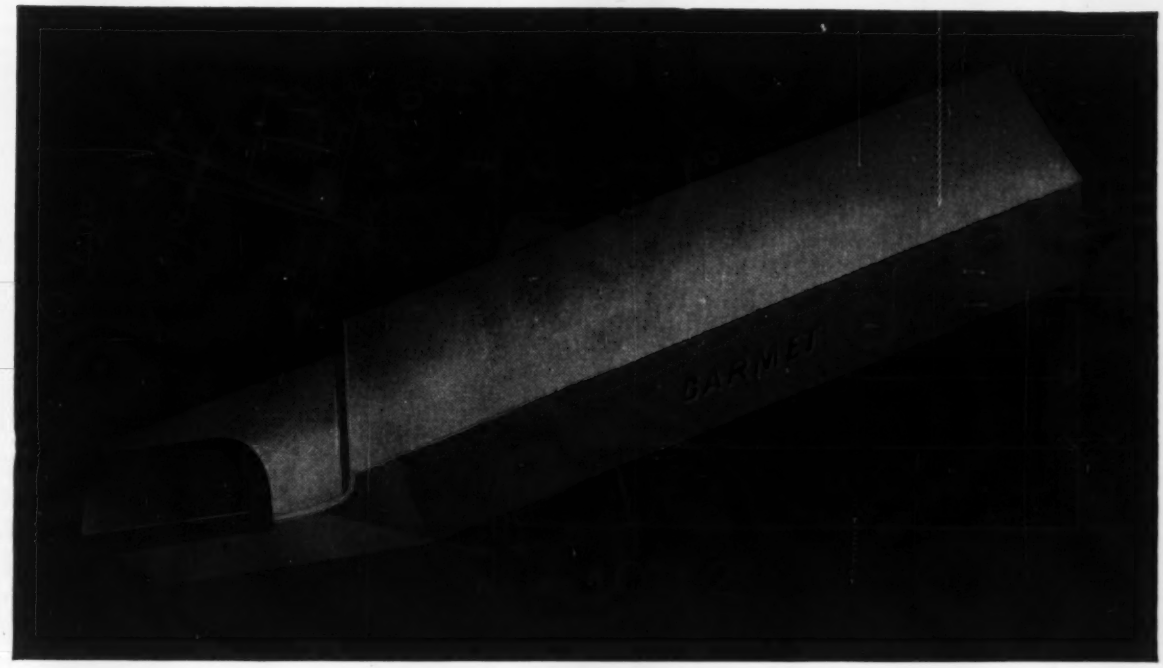
• The turbine system is flexible. It can be combined with other blowing equipment, to supply air at 35 psi to several stacks.

The unit will be operated with two steam turbines to blow as many as five blast furnaces. In other applications, it could be used to blow one furnace, or to blow two, using a split wind system.

The turbine isn't connected to an external mechanical load when it's used as a blower. But it could be used as a source of mechanical or electrical power and kept in reserve for blast furnace service.

• The system includes a gas combustor, a turbine, a fuel compressor, and an air compressor. A smaller steam turbine is used for starting.

Blast furnace gas is compressed in an axial flow compressor that's geared to the main shaft of the tur-



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CA-604	High Velocity finishing.	C-8
CA-605	Precision boring steel. Light, fast cuts.	C-8
CA-606	Light, fast machining on steel, stainless and high temp. alloys.	C-7
CA-608	Light to medium-heavy machining on steel.	C-7
CA-610	General machining on steel. Heavy roughing cuts.	C-6

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bine. Compressed fuel enters the single combustor, under the turbine.

Part of the air flow from the main air compressor (38 per cent) goes into the cold blast main for the furnaces. The rest goes into the regenerators, where it's heated. In the combustor it is combined with fuel gas and burned. Gases at 1350° F expand through the turbine, exhausting into the regenerators at 950° F. Heat exchange between compressed air and exhaust gases in the regenerator brings exhaust temperature down to 540° F.

These units are geared to the main shaft: Lubricating oil pumps, a reverse flow, impeller type governor, an overspeed trip mechanism, a motor driven turning gear assembly, and a steam starting turbine. The starting turbine is connected to the gear train through an air operated, friction type clutch, which may be engaged or disengaged at any speed up to 2500 rpm.

• Distillate oil is used as a starting fuel and to supplement a weak or erratic blast furnace gas supply.

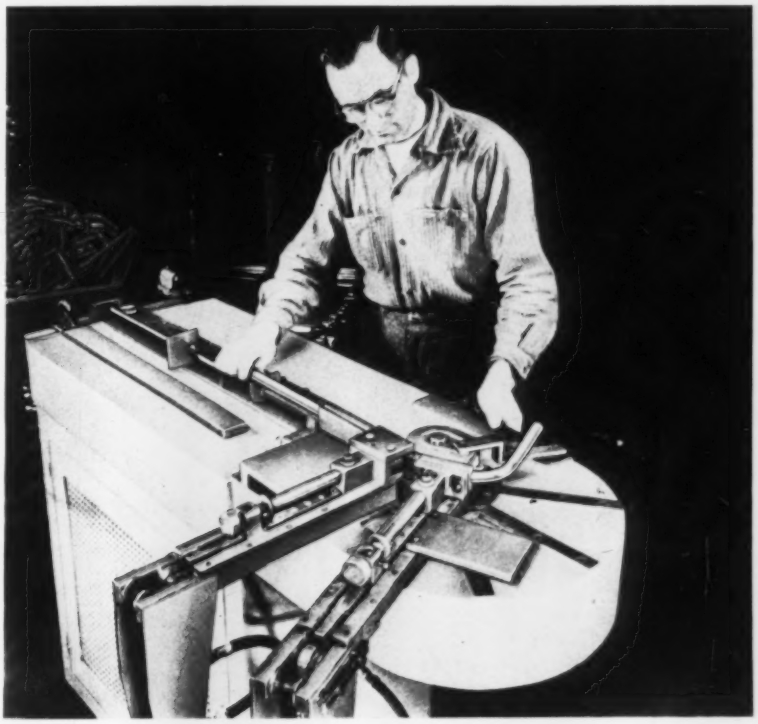
The turbine is started and run up to 2600 rpm on distillate oil. The fuel gas valve is then opened, and the governor is set to position the speed control valve. Maximum speed: 3600 rpm. As the setting of the governor is changed to a higher speed, pressure is built up in the fuel line, a check valve is opened, and gas is forced into the combustor. As speed increases, the governor switches the turbine from fuel oil to blast furnace gas.

If the gas supply is reduced, or if its Btu value drops, distillate oil is added automatically to enrich the fuel intake and keep turbine power up.

Aluminum Bearings Tested

Journal box bearings of aluminum-tin alloy are being tested by Aluminum Co. of America, Pittsburgh, on 100 freight cars. The tests, conducted at the company's Cleveland Development Div., are authorized by the Association of American Railroads. In laboratory tests, the aluminum parts have taken severe scuffing many hours longer than those made of conventional low cost bearing materials, says Alcoa.

Bender Speeds Tubular Part Output, Plating Unmarred



Two bends are made on a piece of preplated tubing in one continuous operation. Hydraulic machine turns out 180 formed parts an hour

FORMING of small parts from preplated tubing with a high production machine that doesn't mar the finish offers savings in manufacturing time and storage space.

A hydraulic bending machine at Foley Mfg. Co., Minneapolis, turns out 180 preplated lawn mower handles an hour, making two bends in each part. The machine was supplied by O'Neil-Irwin Mfg. Co., Lake City, Minn.

• The machine is justified by its high productivity.

Preplated tubing can be formed in the machine, because the finish isn't damaged by the gripping jaws, says William Nettekoeven, methods engineer. Storage space needs have been cut 33 per cent. And handling time has been cut in half.

Use of the power bender in the Production Dept. frees hand benders, formerly used there, for development work in the model shop.

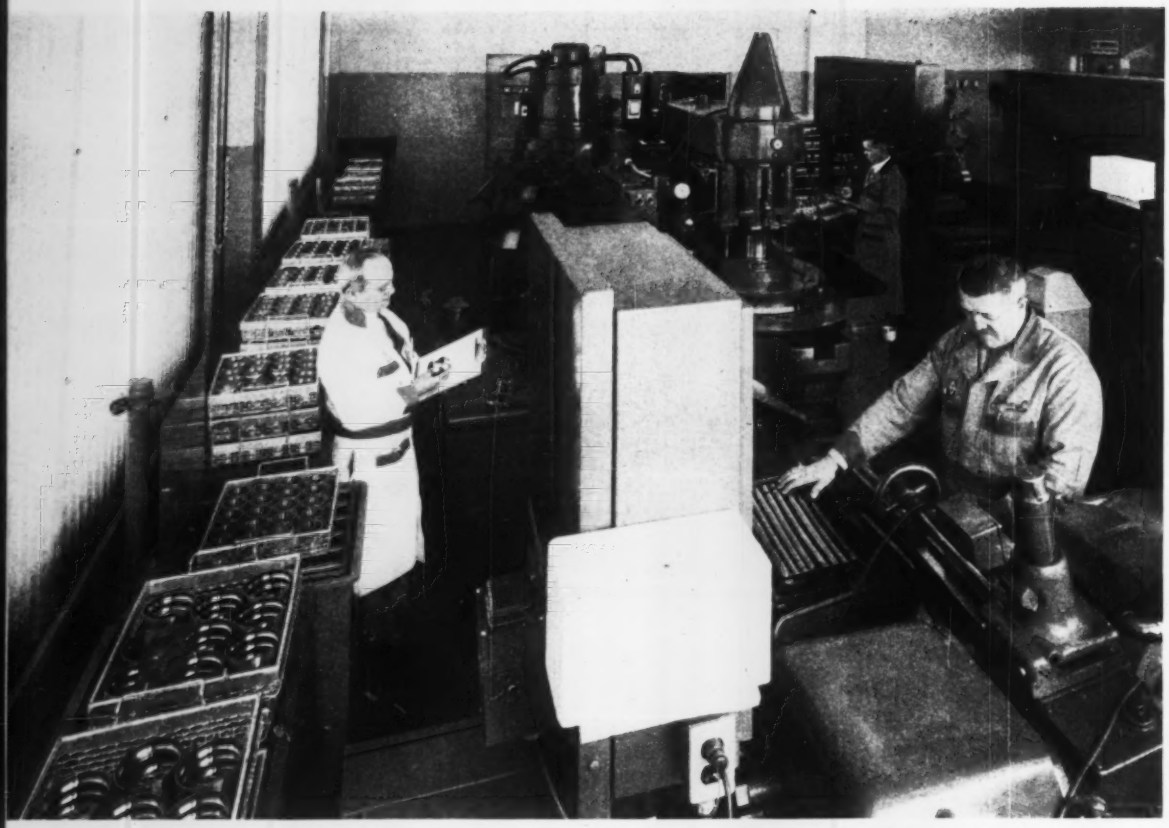
Formed parts, perfected in the model shop, can go into production immediately.

• Mower handles are formed from tubing, but the machine can form a variety of shapes.

The handles are made of 18 gage steel tubing, $\frac{3}{4}$ to $\frac{7}{8}$ in. OD. Bends can be made in the $\frac{3}{4}$ in. tubing on a center line radius as small as 2 in.

The machine can bend $\frac{3}{8}$ by 1 in. flat steel stock edgewise, or any equivalent in tubing, angles, channels, moldings, extrusions, or solid bars.

New Line Turns Out Precision Bearings



The precision grinding area is fully air conditioned. Temperature is held to within 1 degree of 70° F and relative humidity between 45 and 50 per cent. Parts come in through an opening in the rear wall, move to the face grinder, lapping machine, then to the centerless, outside diameter grinder in foreground

IN ANTICIPATION of major growth in the market for ultraprecision bearings, management at Norma-Hoffman Bearings Corp., Stamford, Conn., has opened a new facility that can turn out more than $1 million worth of close tolerance, angular contact bearings annually.

The company feels that most of the demand will come from makers of precision machine tools, aircraft auxiliaries, computers and memory devices, and other products with speeds in excess of 50,000 rpm where extreme precision and maximum rigidity are mandatory.

The air conditioned and humidity controlled facility contains "the most modern machinery, methods, and instruments available to the bearings industry," says Richard D. Robertson, vice president in charge of manufacturing. The department is sealed from the main plant—personnel wash and change to special shopcoats in an air lock. When bearing races enter the grinding area on a conveyor, all qualifying operations have been completed. Parts are ready for finishing and assembly.

• **Process Innovations** — The company's engineers came up with some unusual manufacturing methods to get quantity with no compromise in quality. They include:

• An accurate universal preload grinding technique with automatic in-cycle gaging to prevent overgrinding.

• Inspection at each machine to measure work as closely as 2½ millionths.

• Special honing equipment to give a better finish to bearing races than was possible before.

• Single cycle rough and finish internal grinding with hydraulic clamping to reduce the number of chuckings per part.

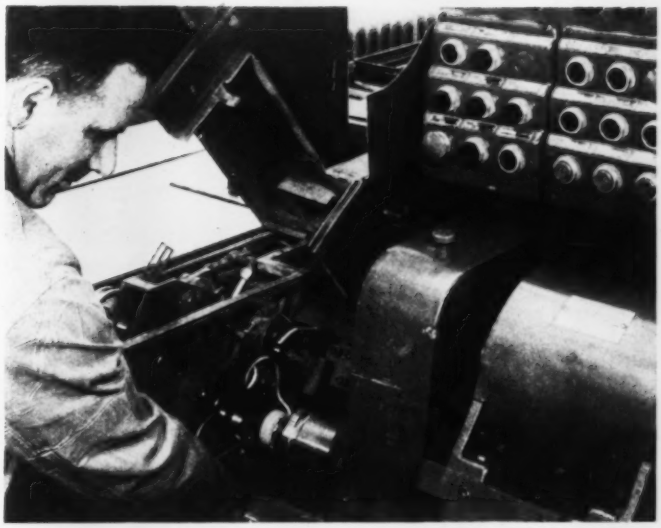
• Deepfreezing of the stock after heat treatment to control dimensional stability and hardness.

• Centralized services with all cool-

(*Please turn to Page* 76)

Isolated from the main manufacturing area, the department is housed in air conditioned, humidity controlled rooms. Product: Angular contact bearings

Special ball track honing machines, developed by Norma-Hoffman engineers, give a surface finish that reduces bearing noise level and insures low starting and running torque



Inside diameters of races are ground on a shoe type centerless grinder. A fluid pressure clamping device holds work against the rotating backing plate. Loading and unloading are automatic

Heald rotary surface grinders do the final preload grinding on races. An air gage records the height of faces, is interlocked with the machine to prevent overgrinding

Beneath the grinding area is the central utility room. Electrical controls, coolant purification, and coolant refrigeration (within 2° F of room temperature) are located here

ant lines in a subsurface utility room.

• Automated OD grinding on a Cincinnati centerless grinder, with an Inchworm motor providing infinitely variable movement of the regulating wheel, plus continuous work gaging.

• **Preload Grinding**—A production sequence has been set up to make it simpler for the customer to specify and install preloaded bearings. End faces of matched inner and outer races are ground so that when he's installing the bearings, all he has to do is draw the faces exactly flush —he then has automatically set the bearing to the specified preload.

To make that possible, production men selectively preassemble inner and outer races with a master set of matched balls. This assembly is preloaded to the specified pressure and, while preloaded, the end faces of the two races are gaged to show the amount of stock that must come off each. After disassembly, the races go to a rotary surface grinder for finish face grinding.

• **Deepfreeze** — After heat treatment in an atmosphere-controlled furnace, quench, and a hot alkali wash, parts move to a Harris Deepfreeze unit where the temperature is dropped to minus 120 F. Parts are then brought up to room temperature and drawn at 360 to 400° F. The Deepfreeze operation provides dimensional stability, inhibiting the metal's tendency to grow. The process also helps maintain a high raceway hardness that adds to bearing life.

• **Quality Control** — Because the bearings require extreme precision, production men decided to maintain a continuous check of tolerances during each operation.

Gages are mounted on pedestals by each machine. Even the output of machines with automatic in-cycle gaging is checked manually to guard against malfunction. Machine setters, rather than operators, make adjustments when tolerances are endangered. Flexibility needed to overcome short run problems is obtained by training operators and setters to be proficient on all machines.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Semiautomatic Welder Cuts Labor One-Third

Replacing manual covered electrode equipment reaps big rewards for fabricator. Only two passes are needed to fill joints in ¾ in. structural steel

LARGE STEEL melting pots for reducing alumina to aluminum are being welded with one-third the labor and equipment formerly needed.

The producer, American Bridge Div., U. S. Steel Corp., Birmingham, uses a semiautomatic device which features a continuously fed wire and a magnetic flux to replace three conventional covered-electrode machines. Combined with submerged arcwelding (for long, straight seams), the new method reduces distortion, increases speed and penetration, and permits production of up to four assemblies a day.

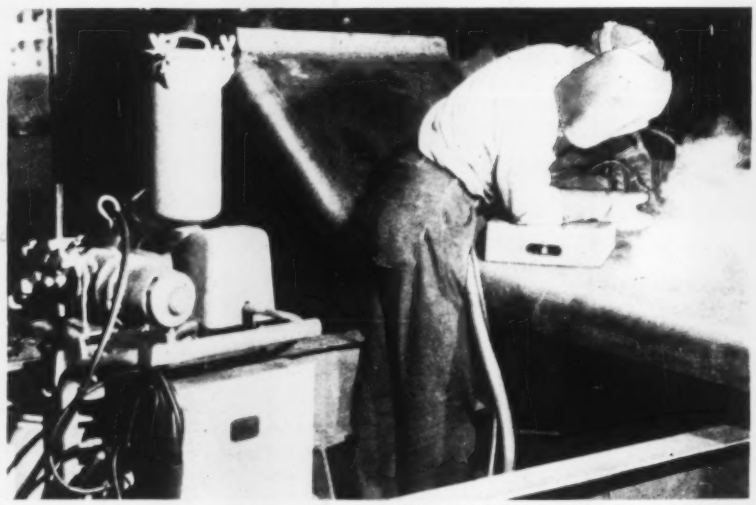
• Greater arc force results in excellent penetration and cost savings.

The deeper penetration of the semiautomatic permits plates to be beveled at 45 degrees (included angle), about half normal practice. The results: Less weld metal is needed and the joints can be filled in only two passes rather than four or five needed with covered electrodes.

The melting pots, which measure 4 by 14 by 28 ft are used in aluminum reduction plants as electrolytic cells. They are made from Type A-7 structural steel, ⅝ or ¾ in. thick.

Plates are cut to shape with an oxyacetylene torch, then bent and formed in press brakes.

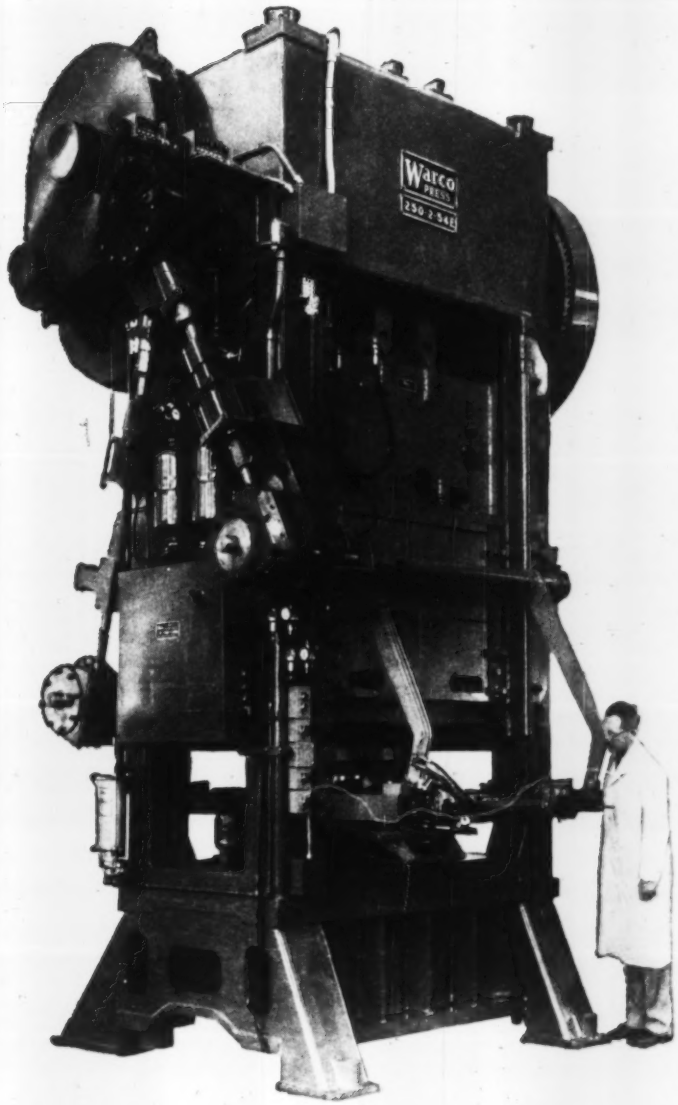
The American Bridge Div.'s choice of Unionarc reflects a growing trend toward semiautomatic welding devices. For certain repetitive production operations where deep penetration is an asset, experts agree that semiautomatics offer faster welding speeds (most can achieve 15 ipm) and high quality physicals. Welds are protected from atmospheric contaminants by CO_2 gas and a flux which also refines or modifies the weld deposit. Cross sections of a good weld when macroetched are usually finer grained than the base metal. Additional savings come from elimination of electrode changing.



Source: Linde Co., a division of Union Carbide Corp.

Operator works with Unionarc's version of the new semiautomatic welders which are showing substantial savings in labor and welding time on many applications. Weld quality is said to be better than that obtained with manual electrodes

Warco automation



You can expect mechanical presses of unsurpassed quality when you specify Warco, for every Warco press is designed and custom built with machine tool precision. The result: Warcos work better, faster—with substantially reduced maintenance.

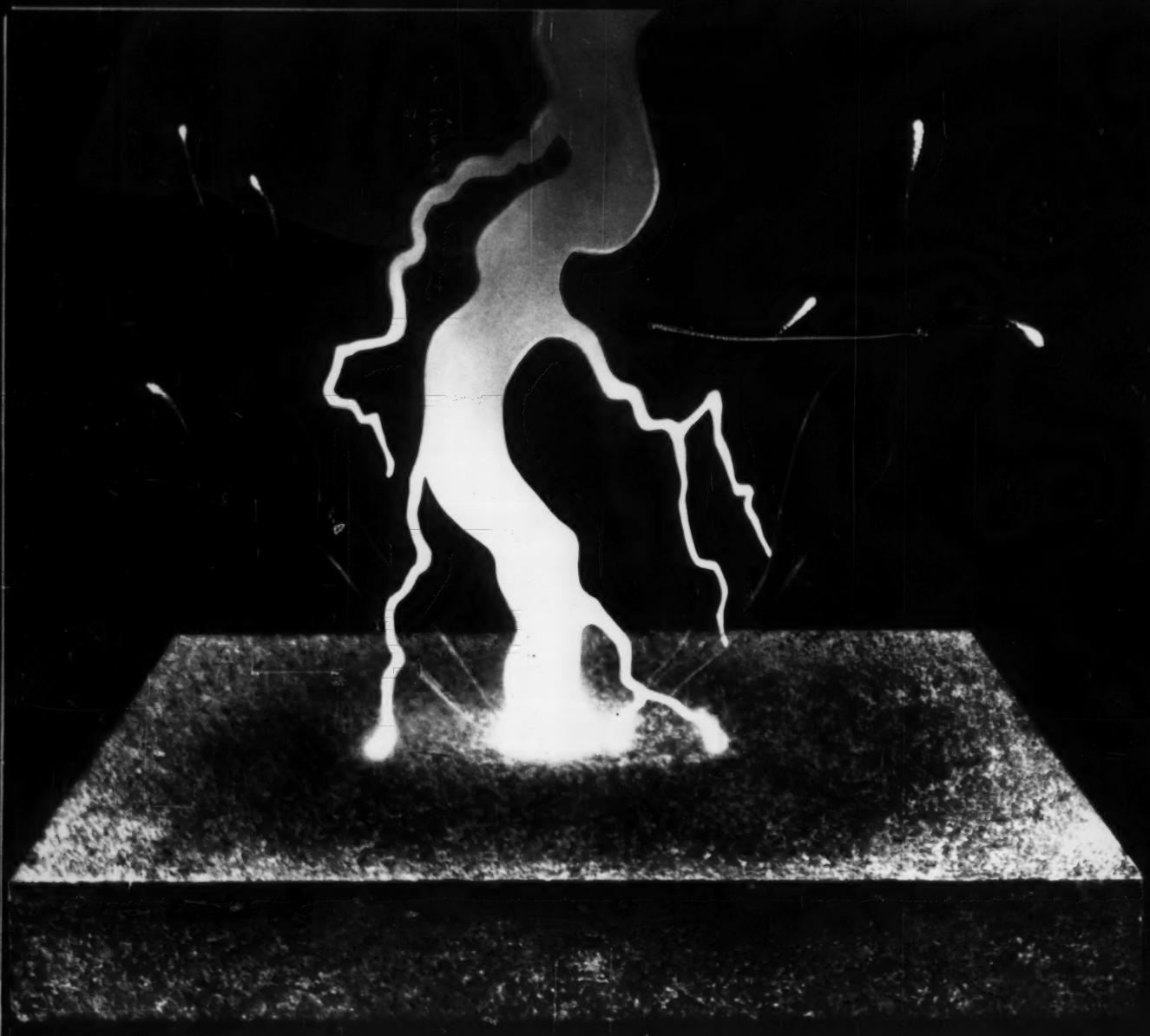
This typical Warco 250 Ton Double Eccentric Shaft Straight Side Press is being used by a leading farm equipment manufacturer to automatically feed and *hot form* the camber and accurately punch and countersink bolt holes in heavy gauge plow shares, discharging them automatically into a heat treating bath. Press slide incorporates a hydro-pneumatic overload device.

If you're considering press equipment, remember . . . if you want maintenance-free quality—you want Warco.

Federal® WELDERS

Warco PRESSES ®

THE FEDERAL MACHINE AND WELDER COMPANY • WARREN, OHIO



High voltage "lightning" discharge at a Malleable test block.

Toughness is Malleable

Under the slamming, bruising strain of a bulldozer's roughshod ride . . . inside the battering air hammer . . . against the repetitive concussion of a machine gun's smashing action . . . wherever conditions are really brutal, Malleable iron castings prove their ruggedness.

When you're looking for toughness, it will pay you to investigate Malleable castings. Contact one of the progressive firms that displays this symbol—

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

MEMBER
MALLEABLE
CASTINGS COUNCIL

New Malleable Irons Meet Gruelling Service Tests

Toughness is a vital requirement in stressed parts. Each application, however, requires a particular combination of physical characteristics to be sufficiently "tough."

Whatever the specific requirements, one of the finest groups of materials available is the Malleable irons, as illustrated in the tables below.

Tensile Properties—A.S.T.M. Minimum Specifications
Standard and Pearlitic Malleable Irons

Designation	Tensile Strength p.s.i.	Yield Strength p.s.i.	Elongation % in 2 in.
Standard			
35018	53,000	35,000	18
32510	50,000	32,500	10
Pearlitic			
45010	65,000	45,000	10
45007	68,000	45,000	7
48004	70,000	48,000	4
50007	75,000	50,000	7
53004	80,000	53,000	4
60003	80,000	60,000	3
80002	100,000	80,000	2

Strengths up to 135,000 p.s.i. tensile and 110,000 p.s.i. yield are produced commercially under individual producers' specifications.

Other Mechanical Properties
Standard and Pearlitic Malleable Irons

	Standard	*Pearlitic*
Modulus of Elasticity in Tension, p.s.i.	25,000,000	26,000,000—28,000,000
Ratio of Fatigue Strength to Tensile Strength	0.54	0.40—0.50
Shear Strength—% of Tensile Strength	80—90%	70—85%
Torsional Strength	Approximately equal to Tensile Strength	
Compressive Strength, p.s.i.	200,000	250,000

Malleable's toughness is illustrated in a severe test conducted by a manufacturer of cab-over-engine trucks. To be absolutely sure of the strength and toughness of a variety of components in the cab, including the critical Malleable iron cab support hinges, a truck was crashed at high speed into a barricade of ice. Result—no hinge damage, even though the truck was seriously battered.

Service-Demonstrated Toughness

Highway railing posts demonstrate Malleable castings' use where impact resistance is critical. As an example, thousands of Malleable railing posts line the Connecticut State Thruway. The State Highway Department reports that there have been no failures of the Malleable iron posts although other materials have failed in several cases.

It is also because of Malleable's toughness that so many of the highest quality hand tools are made of Malleable iron. One leading tool manufacturer tests the quality of its pipe wrenches by using a trick well known as the best way to break a wrench. The wrench jaws are put on a rigid bar, a long pipe is slipped on the handle, and the tester heaves his weight downward on the pipe. Because of their confidence in Malleable's toughness, this company unconditionally guarantees every Malleable wrench housing against distortion and breakage. Another hardware manufacturer makes a similar guarantee against breakage on its line of Malleable vises.

But Malleable iron's proven performance in field service is only one reason for its wide use. To this, you must add Malleable's low first cost, design flexibility, and excellent machinability. This combination offers unique advantages over other metals.

Design and Production Assistance Available

To assist in the use of Malleable castings, a special bulletin on toughness—Data Unit No. 105—is available from the Malleable Castings Council, Union Commerce Building, Cleveland 14, O. These bulletins and engineering and planning assistance are also readily available to you from any member of the Malleable Castings Council.

These companies are members of the

MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
Muncie Malleable Foundry Co., Muncie
Terre Haute Mall. & Mfg. Corp., Terre Haute

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

NEW FROM KIDDE!

2½-gallon pressurized water

2½-gallon anti-freeze (loaded stream)

The easiest-to-operate portable fire extinguishers on the market today!

Here, for the first time, is a practical, sensible design for pressurized water and loaded stream extinguishers. No inverting, no bumping, no valves to turn, no pins to pull (safety lock automatically releases when nozzle removed).

These two new stainless steel Kidde portables feature simple, one-two operation—just aim at fire and push the button. Notice the way the hose is stored, safely out of the way. Notice the wide-open handle—to insure fast action even in gloved hands. Notice the dust-and-waterproof pressure gauges—which show at a glance whether the units are fully charged. All of the features—plus the slim design and light weight of these Kidde portables—make them the easiest-to-store, easiest-to-carry, easiest-to-operate portables on the market today.

Approved by Underwriters' Laboratories. Available in pressurized water for fires in ordinary combustibles, or anti-freeze loaded stream for fires in ordinary combustibles and flammable liquids. For more information, write to Kidde today.

Kidde

Walter Kidde & Company, Inc.
860 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.,
Montreal—Toronto—Vancouver

The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

Rail Joints Glued

Tests show the method eliminates spreading of joints and cuts battering of rail ends

FOR YEARS, most railroad tracks have been bolted together with fishplates. Wear at the rail ends has necessitated frequent track replacements. Now the rail ends are being glued together. The object: To eliminate wear by making the joints smoother.

Armstrong Cork Co., Lancaster, Pa., supplies the rail people with an adhesive called Bondarc.

The technique has been tested for two years in this country and Canada. Results are reported good enough to encourage more widespread application.

• Freezing the joints with adhesive keeps them from opening up.

Slippage tests on 132 lb rails joined with the adhesive show it has four times the tensile strength of an unbonded assembly.

Ultimate strength is reached in 2½ to 4 hours.

The adhesive is spread manually; filling properties of the compound compensate for irregularities on the bearing surfaces.

Joint bars are placed on top of the rails to be bonded. A heating unit goes over the bars and rail ends like an envelope. As soon as the temperature reaches 250° F, the heater is removed and the joint allowed to reach equilibrium at around 150 to 180° F. The parts are assembled conventionally with fishplates (bars bolted together on each side of the rail).

Planer Type Drill Has Automatic Positioning Table

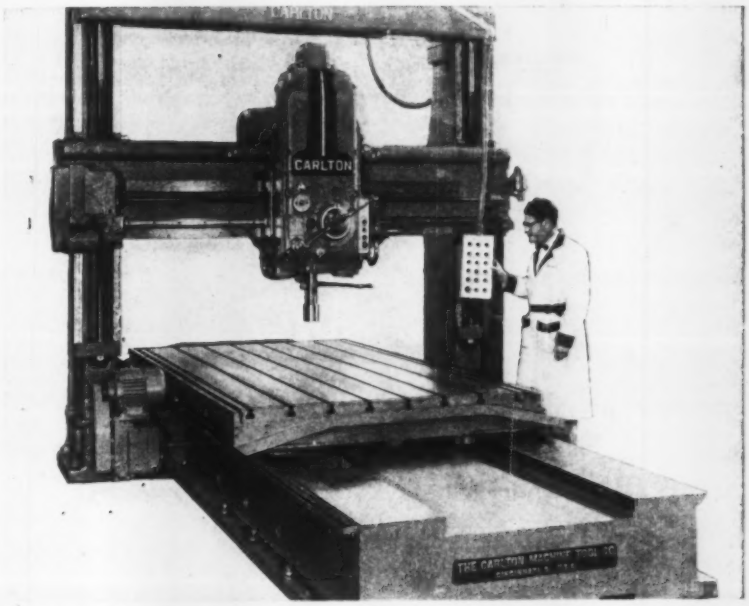
WITH the Carlton planer type drilling machine, workpieces can be accurately located for drilling, reaming, boring, tapping, and milling by any of three methods: Pin bar spacing, vernier and rules, numerical control (tape or manual).

The table is 72 in. wide and 126 in. long. Numerical control permits positioning the table with an accuracy of ±0.0002 in.

When the tape control is furnished, positioning is through precision racks and pinions with readout unit for locking the spindle. The pin bar features pin override control, allowing the operator to override the pins without having to remove them from the bar.

The Carlton automatic positioning table has precision milled slots which enable an operator to locate workpieces for machining operations quickly and accurately. The table operates on nonmetallic ways which increase the loads that can be carried and minimize friction.

The planer type milling machine is well suited for use in machine shops or toolrooms where there is a variety of operations on short production runs, or even on single pieces that come up frequently. A special positioning table and controls eliminate the need for expensive tooling setups.



For more information, *write* Carlton Machine Tool Co., Cincinnati, Ohio.

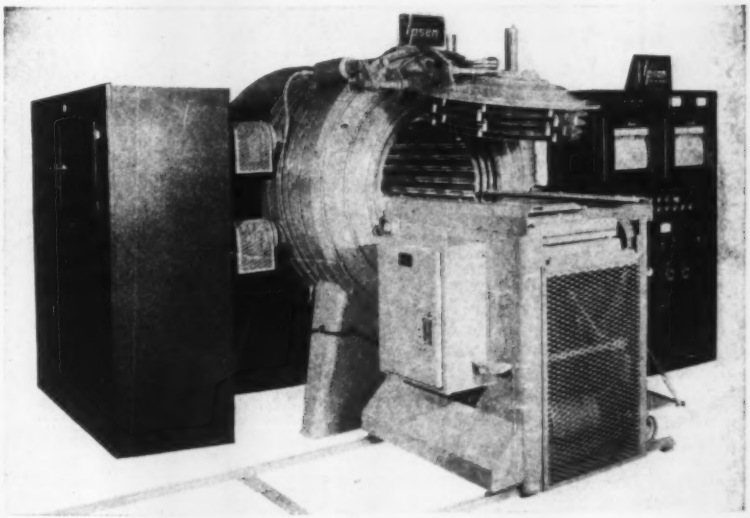
Vacuum Furnace Can Braze Flat Stainless Assemblies

THE IPSEN automatic, high vacuum, cold wall type furnace (V-300) is especially suitable for copper and nickel brazing of flat stainless assemblies.

High vacuum reduces surface tension of the brazing alloy which eliminates crevice formation and corrosion. Flat assemblies are heated uniformly from above and below, sandwich style. That reduces the danger of overheating outside edges.

Other uses include hardening, tempering, drawing, and annealing refractory metals, reactive metals, stainless, and special alloy steels.

The furnace is charged horizontally and has a roller hearth. The charging door is air operated. It



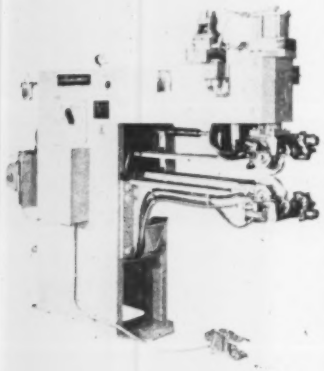
has a 3 in. sight glass. The vacuum system consists of a 100 cfm mechanical pump and a 10 in. diameter vapor diffusion pump. Graphite heating elements (molybdenum heating elements are optional) and multiple radiation shields are employed.

For more information, *write* Ipsen Industries Inc., 715 S. Main St., Rockford, Ill.

Less Floor Space Needed For New Seamwelders

SEAMWELDER models in this line range from 50 to 400 kva. Each size is available as a circular, longitudinal or universal machine in a range of standard throat depths and transformer sizes.

Floor space requirements have been reduced. The unit is readily adjusted for wear or takeup, has



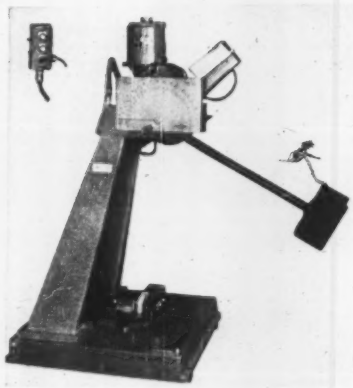
higher performance, and maximum power efficiency. The line is designed to deliver high production runs at lower costs.

For more information, *write* Federal Machine & Welder Co., Warren, Ohio.

Power Impact Tester Remotely Controlled

SAFETY, speed, and convenience are designed into this TMI impact tester. It meets the requirements of ASTM Method E-23 and performs Izod, Charpy, and Tension-Impact tests for metals.

The machine has an automatic



electric safety clutch brake, which stops the pendulum after it has made one complete swing. It also has a motorized pendulum return and remote controls. That is an important safety and time saving factor.

After the pendulum has been arrested, the electric motor with gear head assembly automatically raises the heavy pendulum hammer to its latched position and the machine is ready for the next test. The control panel can be located any distance from the machine.

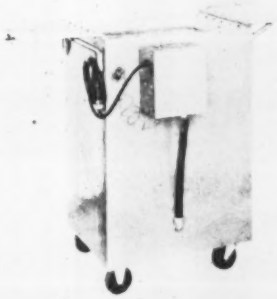
For more information, *write* Testing Machines Inc., 72 Jericho Turnpike, Mineola, N. Y.

Degreaser Is Portable, Has No Water Jacket

YOU CAN wheel this chemical vapor degreasing machine where you want it and plug it into the nearest electrical outlet. Its operation is simple.

The use of an electrical thermal switch does away with water piping normally used to prevent the escape of chemical vapor. If an electrical failure should occur, the machine is automatically turned off.

Other advantages: Optional circulating spray; a special drain plug and angulated plate which simplifies solvent recovery; low maintenance cost; and easy parts replacement.

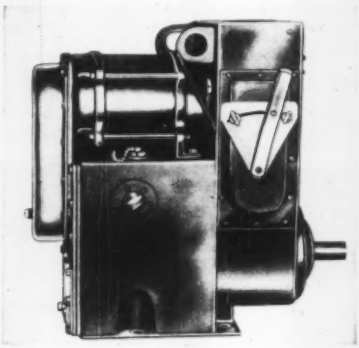


For more information, *write* King Co. Inc., 60 Carteret Rd., Port Reading, N. J.

Hydraulic Drive Unit Has Reversible, Variable Speed

THIS 1½ hp hydraulic transmission is suited to heavy duty applications where variable speed and instant reversing can increase production and efficiency, as in machine tool drives, conveyors, tappers and reamers, pumps, blowers, and spring coilers.

The unit provides variable speeds from 0 to 350 rpm in either direction. Identical or different forward and reverse speeds can be set. Speed control is smooth, precise, and constant.



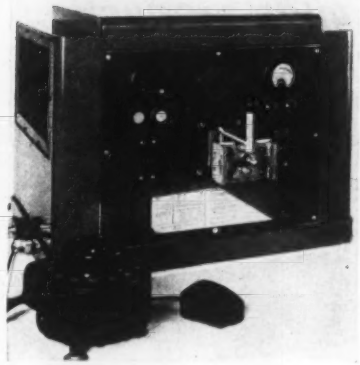
Other features include instantaneous reversing, neutral position, and integral torque multiplier for high torque applications. Included in the package: Electric motor and a 6 qt capacity oil reservoir.

For more information, *write* Roberts Mfg. Co., 849 W. Grand Ave., Chicago 22, Ill.

Induction Generator Offers Flexibility in Heating

TYPICAL uses for the Model 150, 2 kw output generator include hardening, brazing, soldering, forging, and annealing, all at relatively high rates of production.

An optional two position transfer switch permits the use of two

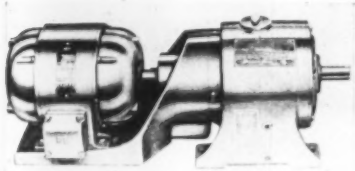


work coils. That allows the operator to heat objects alternately (he can prepare one part while another is being heated) to achieve practically 100 per cent utility. The unit also has an automatic timer that can be preset for various operations on a production line basis.

For more information, *write* Induction Heating Corp., Brooklyn, N. Y.

All-Motor Gear Reducers

AVAILABLE in ½ through 50 hp ratings, the Reuland all-motor gear reducer units are supplied in single, double, and triple reductions.



They provide original equipment manufacturers and other users with an almost unlimited selection of special drive motor and reducer combinations, all from one source.

For more information, *write* Reuland Electric Co., Alhambra, Calif.

Vertical Milling Machine Has Six Spindle Speeds

IT'S DESIGNED for low cost, high precision milling and boring operations.

The unit has a swivel head and is capable of angular and vertical operations. The ram and turret machine has a 7 x 27 in. table with a longitudinal feed of 16 in. Crossfeed is 8 in.; vertical feed is 15 in.; and ram movement is 12 in. Quill travel is 4 in. Maximum distance from the spindle nose to the column face is 16 in. and maximum distance from the nose to the top of the table is 18 in.

The hard, chrome plated quill is 3¼ in. in diameter. The quill feed uses an accurate, smooth lead screw and nut arrangement.

Spindle brake, lock, and internal quill lock are standard equipment. A complete line of accessories is available.

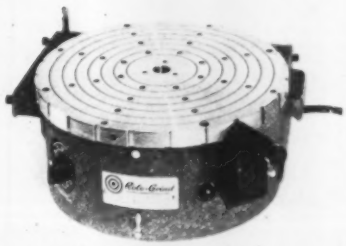
A V-belt drive is used. The unit has six spindle speeds from 250 to 3450 rpm or from 185 to 2550 rpm. Belt positions can be set with one hand.

For more information, *write* U. S. Burke Machine Tool Div., Cincinnati Mfg. Corp., Brotherton Road at Pennsylvania R. R., Cincinnati 27, Ohio.

Motorized Rotary Table Cuts Fixturing Time

USEFUL for inspection or production, the Model 710-V indexing rotary table can be used with surface grinders, jig grinders, or drill presses.

The unit is hand operated to give a combination index 2, 3, 4, 6, 8, 12, and 24. An index on a 10 in. circle is held to 0.0003 in. on 24 sections. The table is powered by an electric motor with variable speed control. Forward - reverse switch clutch is provided for hand operation and indexing.



Designed especially for laboratory development or production, special models can be made for use on ultrasonic and disintegrating machines.

For more information, *write* M & M Tool & Mfg. Co., 1124 E. Third St., Dayton 2, Ohio.

NEW literature

Write directly to the company for a copy

Shaped Tubing Data

Shaped tubing in square, rectangular, elliptical, oval, and a variety of other cross sections is described in Data Memorandum No. 17. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Wear-Resistant Alloys

A 32 page booklet covers 11 cobalt and iron-base alloys. Chemical, physical, and mechanical properties are presented. Dept. LT, Haynes Stellite Co., division of Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.

Sandwich Core Material

A 12 page bulletin, SP-1, describes Multiwave, a formable sandwich core material. Narmco Resins & Coatings Co., 600 Victoria St., Costa Mesa, Calif.

Eye Safety Equipment

Catalog A-1762, 40 pages, lists the complete line of Bausch & Lomb safety products for industrial and laboratory job requirements. Safety Products Dept., Bausch & Lomb Optical Co., Rochester 2, N. Y.

Guide to Casting Alloys

"A Quick Guide to the Nickel-Containing Casting Alloys" presents condensed information on the range of properties offered, industries served, and general applications for each of the alloys included—27 pages. The Readers Service Section, International Nickel Co. Inc., 67 Wall St., New York 5, N. Y.

Reduced-Voltage Starters

Bulletin GEA-6860, contains a definition, tells when and where to use, and how to select GE's reduced-voltage motor-starting equipment. General Electric Co., Schenectady 5, N. Y.

Automatic Heat Treating Units

A bulletin describes the Ipsen straight-through furnace designed for bright carbonitriding and neutral hardening, marquenching, normalizing, and annealing. Ipsen Industries Inc., 715 S. Main St., Rockford, Ill.

Emergency Power Setup

Bulletin 21-200 explains the inverter-diverter continuous ac and dc power system that changes instantly from normal to emergency power when current interruptions occur. Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, Ohio.

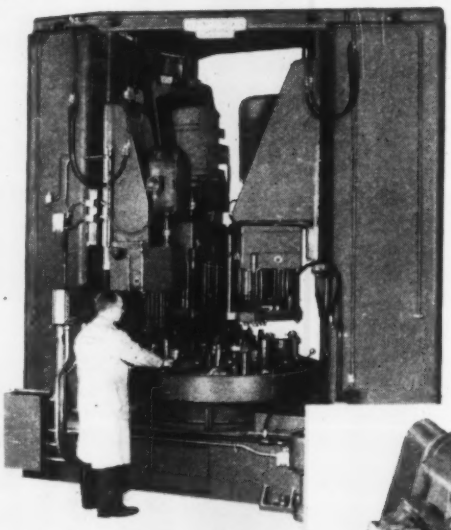
Material Handling Discussion

"Warehouse Layout: Narrow Aisles or Wide?" is an 8 page brochure that discusses the advantages and disadvantages of this problem. Automatic Transportation Co., 149 W. 87th St., Chicago, Ill.

KEARNEY & TRECKER *builds production*

MACHINE TOOLS FOR EVERY INDUSTRY

Since 1898 . . . Kearney & Trecker Customer Engineering Service — supported by an outstanding staff of engineers experienced in production milling machine design and application — combined with the finest and latest machine tools in an ultra modern plant is always ready to solve your production problems.

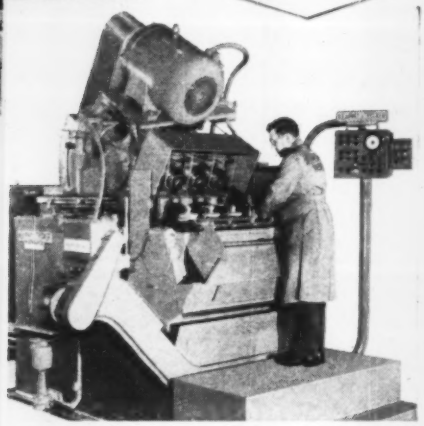


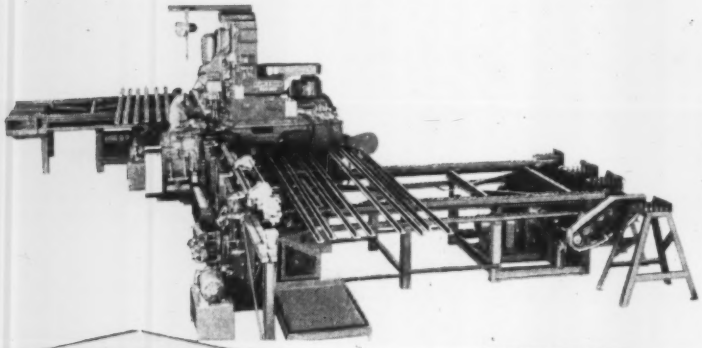
Automotive Industry

this 88 spindle, 3 vertical head machine performs drilling, chamfering, counterboring, trepanning, spot-facing, reaming and tapping operation on a differention case and cover. PRODUCTION — 67 cases, 67 covers per hour.

Oil Industry

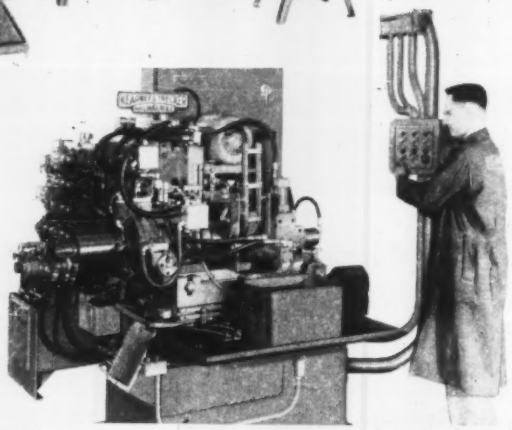
automatic 4-spindle milling machine mills 4 rock bit cones *simultaneously*... in a trunnion-type fixture having 4 work-piece spindles. PRODUCTION — a constant flow of this expendable type tool to meet the steady demand.





Elevator Industry

12 spindle automatic transfer machine mills mating tongue and groove on ends of elevator guide rail-drills mounting holes in rail flanges—for continuous rail mounting. PRODUCTION — 28 completely machined rails per hour — 180% increase over old method.



Tool Industry

Flutes and shank squares are milled on tap blanks by this automatic machine. Tap blanks are hopper loaded and automatically unloaded. RESULT—greatly increased hourly production.

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August 31, 1959

Foreign Mills Up Prices as Market Tightens

FOREIGN mills are cashing in on America's steel strike by boosting prices on exports to this country. They aren't passing up their chance to get what the traffic will bear.

Deformed bars, bar size angles, structural angles, I-beams, channels, and merchant bars are up $2 a ton at Atlantic, Great Lakes, Gulf, and West Coast ports. Prices on plates are up sharply, reflecting strong demand in Europe as well as in the U. S.

PREMIUM PRICES—Paradoxically, foreign producers who got a toehold in the U. S. market by undercutting American mills are selling some products at higher than domestic quotations. Galvanized sheets from South Africa are being purchased on the East Coast at $5 a ton above the American mill price. Belgian galvanized steel for delivery in September is being offered at $10 above the domestic market.

STILL UNDERSELLING—In most cases, European steelmakers have been able to boost their prices substantially without going above the U. S. market. At Houston, for example, 2¼ in. angles have gone up 25 per cent since February (when they were $91.20 a ton). Even after they were upped to $114 on Aug. 15, they were still 17 per cent below domestic mill quotation.

MOST INVENTORIES O.K.— Steelmakers are confident that most of their customers have enough metal on hand to continue normal operations through September. By Sept. 15, they'll expect to hear "squeaking wheels"—cries from a lot of small users whose stocks are out of balance. But even then two-thirds of their customers will be adequately stocked. Chrysler Corp. estimates that its supplies will allow full production schedules until November. With the exception of GM's Cadillac Div., automakers will have no trouble filling their dealer pipelines.

SHEET SHORTAGES SEEN— With galvanized sheet inventories in the nation's steel service centers almost depleted, cold rolled sheets are also coming into critical short supply. They're being allocated at Chicago, just as galvanized items have been for the last three months. One result of the current shortages is the substitution of available steel items for hard-to-get products.

USERS FEEL PINCH— Nonintegrated mills are being squeezed out of the market as the strike drags on. In Chicago and Pittsburgh, leading producers of cold-finished bars have suspended operations for want of hot rolled material.

HARDSHIPS OUTLAST STRIKE— Some of the most severe hardships will probably be felt after the strike has been settled. It will be two or three weeks after blast furnaces are relighted before steelmakers will be able to ship even ordinary grades of low carbon drawing steel. They'll need up to eight weeks to deliver high carbon spring steels, alloys, and stainless. Caterpillar Tractor Co., Peoria, Ill., estimates that its steel supplies will permit full production through Sept. 18, but warns employees that operations could be affected even if the strike is settled before then.

OUTPUT UP SLIGHTLY—Last week, steelmakers operated their furnaces at 12 per cent of capacity, up seven-tenths of a point from the previous week's revised rate. Production was about 340,000 ingot tons.

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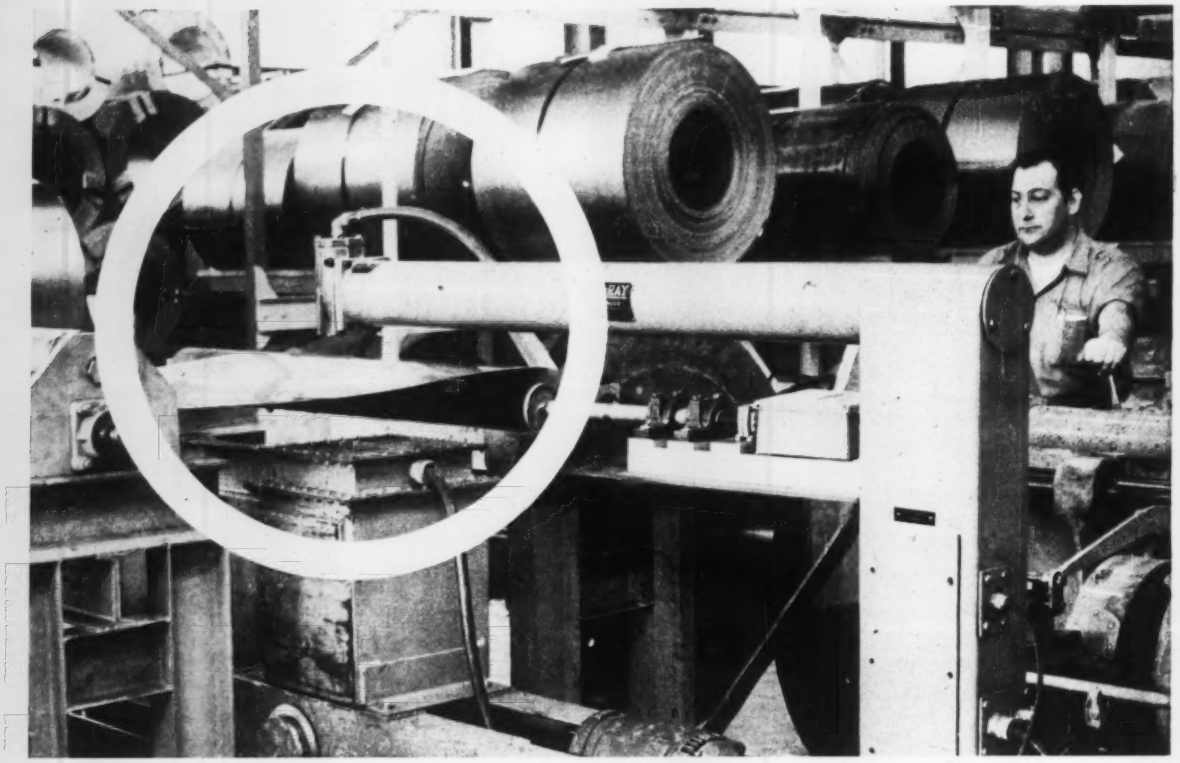
Current prices were published in the Aug. 24 issue and will appear in subsequent issues.



Edgcomb Steel & Aluminum Corp.'s "metals banking plan" starts with accurate gaging of tolerances in coils of strip kept in stock to fill customers' orders promptly. The XactRay gage (circled above) reads thickness variations which are recorded on strip charts and lets the buyer know just what tolerances he is getting

Metals 'Bank' Has X-Ray Teller

A NONCONTACT, x-ray thickness gage provides controlled measurements for coiled strip in the "metals banking plan" developed by Edgcomb Steel & Aluminum Corp.'s Hillside, N. J., warehouse.

An x-ray beam measures and records thickness variations. Tolerances are recorded on continuous strip charts as aluminum, stainless steel, and cold rolled steel are uncoiled and recoiled at speeds over 400 fpm. Then, when a buyer's order comes in, Edgcomb can tell the customer what gage variations he will receive on his order, within 0.0001 in.

• **Unusual Service** — Richard L. Bachmann, warehouse manager for Edgcomb, says: "The new x-ray gage has enabled us to provide unique customer service through our metals banking plan." Under the plan, regular customers estimate their requirements for a given period, usually three months to a year. They specify gage, temper, and finish only, not widths or quantities. The warehouse then stockpiles enough material to meet these commitments.

The x-ray gage, called XactRay, is made by Industrial Gauges Dept., Daystrom Inc. At Edgcomb, it is mounted on a track between the uncoiler and the recoiler. Adjusted to operate at 3 second intervals, the gage traverses the full width of the strip (8 to 48 in.).

Thickness measurements are made by passing a pencil-size ray of energy through the material which is collected and converted by a receiver into an electric signal. A chart recorder, installed in a console near the uncoiler, logs complete measurement data. Strip chart records of these data are filed in a central office, keyed to the warehoused coils.

Sheets, Strip . . .

Sheet & Strip Prices, Page 93 & 94

Steelmakers are confident that most of their customers have enough metal on hand to continue normal operations through September. Principal among the exceptions are users of galvanized material.

Since gaps are appearing in reserves of practically all grades, consumers are showing increasing concern over what their positions will

be by mid-September, or shortly thereafter. Meanwhile, with the vacation season now practically ended, heavier consumption is accelerating the shrinkage in inventories.

Because order backlogs are so large, sales executives are reluctant to open their fourth quarter books. If the strike lasts much longer, delivery promises for that period will be meaningless. Some buyers are so insistent sellers can't turn them down, but there's no getting around the probability that some of the tonnage being booked for fourth quarter won't be shipped this year.

Mills that have big inventories of slabs will be able to ship common types of sheets to their customers a week after operations are resumed. Starting at the blast furnace, they'll need two or three weeks to ship ordinary grades of drawing steel (0.10 carbon or less). Unless the strike is settled early in September, users of specialty steel may be in serious trouble before yearend. Reason: It will take producers eight weeks to deliver high carbon spring steels and alloys.

Union Hardware Co., Torrington, Conn., has received a large contract for cartridge link steel. The order was booked for poststrike delivery.

Imported Steel . . .

Imported Steel Prices, Page 100

Prices on some steel products for shipment from continental West Europe have stiffened, with delivery promises running to November and beyond. Reformed bars, bar size angles, structural angles, I-beams, channels, and merchant bars are up 10 cents per 100 lb at North Atlantic, Great Lakes, South Atlantic, Gulf Coast, and West Coast ports. Prices on plates (basic and bessemer) are higher at all ports, reflecting a particularly tight market abroad.

But prices are unchanged on sheets, furring channels, hot rolled bands, and wire products, including rods, for shipment from West Europe.

The Houston area illustrates the trend in imported steel prices. In February, 2 x 2¼ in. angles ordered through a direct mill agent were priced at $4.56 per 100 lb, f.o.b. cars, Houston. An Aug. 17 price list from the same mill for the same item quoted $5.70

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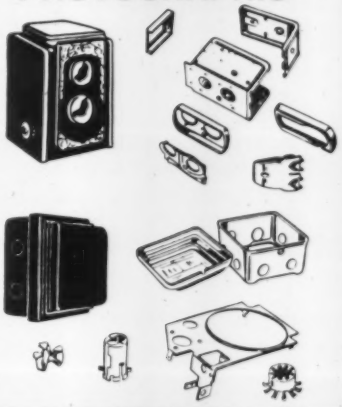
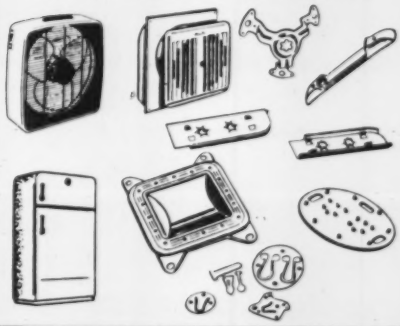


HEATING—COOLING



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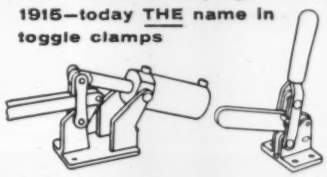

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and promised delivery within three to four months. The increase over a six month period was 25 per cent. But the present price is still 17 per cent under a domestic mill's pre-strike quotation.

Prices on foreign steel purchased from a mill depot range from the same to slightly higher than those of domestic mills. Imported steel purchased from a speculator or broker may vary widely either way. The port of Houston is receiving an average of 15,000 tons of foreign steel a week.

Some galvanized sheets from South Africa (generally heavy gage) have been purchased in the Philadelphia district from stock at prices about $5 a ton above the domestic market. Some Belgian galvanized sheets for delivery in September are offered at $10 a ton above the domestic market. Other grades of foreign sheets are being purchased in increasing volume.

Steel from Italy arrived in Buffalo last week via the St. Lawrence Seaway. It will be used on the State Power Authority's new Niagara power project near Lewiston, N. Y. Several months ago the Power Authority placed an order for 900 tons of steel with an Italian company which underbid American producers.

The movement of foreign steel into Buffalo in the form of scrap rails has pushed close to a record 25,000 tons for this navigation season. The motorship *Elise Schulte* reached Buffalo docks recently with 575 tons of rails from Antwerp, Belgium. They are consigned to the Buffalo Steel Corp. for rerolling.

Extended deliveries now quoted by continental Western European mills are due to heavy home consumption and sales abroad including Russian satellite countries. Heavy tonnage is moving to China for at least $10 a ton more than can be obtained on steel shipped to the U. S. and on basis of buyer's acceptance at the mill—not upon arrival in China.

Good tonnage is also moving to South Africa and India, but relatively little to South America. (South American business has been generally disappointing to European producers.)

Steel Bars . . .

Bar Prices, Page 92

Although its contract with the United Steelworkers wasn't scheduled to expire until Aug. 31, one of the leading producers of cold finished bars in the Pittsburgh district had to suspend operations Aug. 21. Reason: Lack of hot rolled material.

A few hot mills are still operating, but they're too busy taking care of regular customers to accept orders from new accounts. Although some users are offering conversion deals (they'd supply the ingots), the volume isn't large enough to support balanced bar mill operations.

Consumers of both hot and cold carbon bars are endeavoring to get more orders on mill books for delivery as soon as possible. In view of the continued gloomy outlook for an early steel wage settlement, they hold little hope for getting deliveries against current orders before November, if then.

More bar users are turning to distributors to fill gaps in stocks. Sizes in short supply in New England cover mostly chemical and

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physical specifications in sizes 2 in. and under. Consumption in that area approximates 80 to 85 per cent within this smaller size range.

With one exception, all production in New England is confined to converters. The latter are reluctant to take on cold finished bar orders from other than regular accounts. On that basis, some are booked into the fourth quarter to the extent hot rolled material is available.

Nicholson File Co. closed manufacturing operations at Providence, R. I., transferring production to branch plants. For years, Nicholson was a leading user of flats and special shapes in the area.

Tubular Goods . . .

Tubular Goods Prices, Page 98

Inventories of oil country goods held downriver from Pittsburgh are rapidly being depleted. Distributors' stocks have dropped an estimated 50 per cent since the strike began. Because of the emphasis on dual completions, 2⅞ in. OD tubing is being used for casing and demand for small diameter (¾ to 1¼ in.) tubing is strong. Users are also snapping up 4½ in. casing, being used in place of 5 in. and 7½ in. pipe. Distributors aren't getting any delivery promises from the mills on new orders, but they're trying to assure themselves of priority once the back orders have been cleared up.

The major oil companies are adequately stocked for at least a month, but some of the independents are starting to feel the pinch. As they run out of the steel they need, they'll revise their drilling programs, substituting larger sizes or more costly items.

Sales of miscellaneous line pipe are expected to be slow for the balance of the year, but demand for trunk line pipe continues strong. Producers will probably operate close to capacity during the fourth quarter. Seamless pipe is running on a par with standard.

The summer's seesawing oil well drilling trend reverted to the downside again for the week ended Aug. 17. Hughes Tool Co., Houston, reported 2146 rotary rigs at work, 14 less than in the previous week but 236 more than in the comparable period a year ago.

Demand for cast iron goods continues strong. Deliveries, which were on a 30 day schedule, are now at four to six weeks because plants have increased backlogs. Vacations have also set back deliveries.

Distributors . . .

Prices, Page 99

Steel service centers booked more business in August than in July due to the continuation of the steel strike and the passing of the vacation peak at consuming plants. Distributors anticipate a further gain in business in September as there is no indication of an early settlement of the steel strike and prospects are favorable for a pickup in general industrial activity.

Major concern of most distributors is whether or not they will have sufficient inventories to meet demand. Their stocks of some grades and sizes have been depleted. In many instances, they are being called upon to furnish steel items which are required under new contracts booked by their customers and which were not previously stocked and not stocked in the volume now required.

Items in tightest supply in most districts are galvanized sheets, light plates, and cold and hot rolled sheets.

Competition from speculators and brokers of foreign steel is being blamed for holding the lid on domestic distributors' sales in the Southwest. While some service center inventories are spotty on some items, the consensus is that no pinch will come for at least two months in that territory.

Wire . . .

Wire Price, Pages 94 & 97

Because of the hundreds of sizes and grades of wire required in manufacture of fabricated industrial items, spot shortages are appearing in inventories of this product. Steel service centers can contribute little in filling needs. Nonintegrated converters are getting more urgent demands to fill the gaps and their ability to do so depends on rod specifications.

Over-all stocks of finished wire are substantial, but there's a short-

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age of high carbon sizes to meet contracts booked during the strike.

In New England, three integrated mills are down; all are leaders in production of specialties.

Plates . . .

Plate Prices, Page 92

Although plate fabricators are increasingly concerned about their inventories, most have enough steel to continue their operations for another month. Barge builders have heavy production schedules and are known to be draining their inventories at a rapid rate.

Producers in the Pittsburgh area took orders through September, but they haven't seen fit to open their fourth quarter books. When they do, it will be on the basis of delivery three or four months after the strike ends. Mills making wide (100 to 160 in.) sheared plates are sold out for the balance of the year. Demand for universal plates (30 to 48 in. wide) is good but bookings aren't nearly as heavy as for sheared plates.

Several large boiler contracts, including ship powerplants, are dependent on poststrike plate tonnage. Builders of such equipment are not hopeful of obtaining requirements before first quarter.

Details are being cleared for construction of three new tankers at the Bethlehem Quincy, Mass., yards: One 106,000 tons and two 46,000 tons each. Also in New England, several large fabricating projects have been placed for which plates will not be rolled until after the strike.

Inquiries for new projects involving plate fabrication in the Pacific Northwest have dropped. Seattle is planning a major expansion of its water system, involving 36 in. pipe, which may be up for figures late this year.

Lukens Steel Co., Coatesville, Pa., has a contract with the Bureau of Ships for development of high strength submarine pressure hull plates.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 100

Production of coke in the U. S. in June amounted to 6,043,665 net tons, reports the Bureau of Mines. That was 5 per cent below the May output of 6,376,771 tons, but was 53 per cent above the June, 1958, output of 3,943,900 tons.

Producers' stocks of oven coke continued to drop and at the end of June, 1959, were equal to 14.7 days' production. Bituminous coal stocks increased 5 per cent and on June 30 were sufficient for 44.6 days' supply at the prevailing consumption rate.

Iron Ore . . .

Iron Ore Prices, Page 100

Only 37 vessels in the 242 American Great Lakes ore fleet were in commission on Aug. 15. The vessels represented 14.82 per cent, or 439,500 tons, of the fleet's total trip capacity of 2,965,985 tons. As of June 15, 231 vessels representing 96.8 per cent of total trip capacity of 2,975,035 tons were in commission.

Strike Forces Sharp Cut In Steel Ingot Output

Ingot tonnage lost during July because of work stoppages jumped to 4,583,000 tons, reports the American Iron & Steel Institute, New York. The tonnage lost from this cause during the first seven months of the year amounted to 4,757,000 tons.

Production of steel ingots in July was 5,227,129 tons, bringing the total for the first seven months to 69,505,332 tons. Output in July a year ago was 6,420,405 tons and for the first seven months 44,172,892 tons.

The industry operated at 41.7 per cent of capacity in July compared with 89.9 per cent in June and 53.7 per cent for July, 1958. For the first seven months, operations averaged 81.1 per cent against 54 per cent a year ago.

The breakdown of production by states:

Steel Production—July, 1959
(Net tons)

States:	July	Year to Date
New York	232,344	3,625,806
Pennsylvania	1,223,888	17,698,337
R. I., Conn., N. J., Del., Md.	318,672	4,738,361
Va., W. Va., Ga., Fla.	277,107	1,960,990
Kentucky	67,129	911,401
Alabama, Tenn., Miss.	117,526	2,507,753
Ohio	995,327	12,812,833
Indiana	663,235	9,162,518
Illinois	518,520	5,677,200
Michigan	327,899	4,063,397
Minn., Mo., Okla., Texas	175,059	2,105,349
Ariz., Colo., Utah, Wash., Oreg.	134,315	2,287,750
California	122,108	1,953,637
Totals	5,227,129	69,505,332
Tonnage lost from work stoppages	4,583,000	4,757,000

Data from American Iron & Steel Institute.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

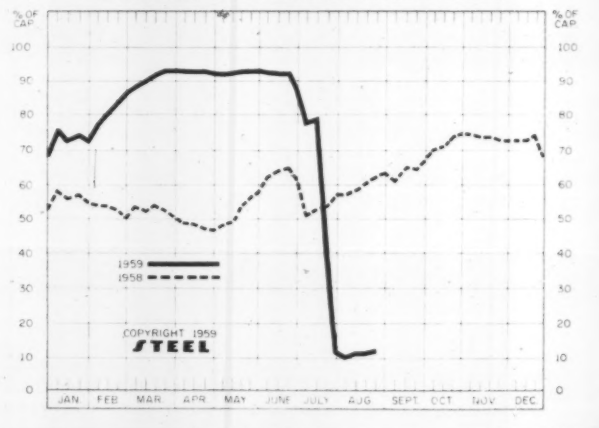
	Week Ended Aug. 30	Change	Same Week 1958	Same Week 1957
Pittsburgh	2	0	56	81
Chicago	5	+ 0.5	74	84.5
Eastern	10	0	61	87.5
Youngstown	9	0	48	79
Wheeling	48	— 2.5	80	92
Cleveland	6	0	53.5	85
Buffalo	4	0	51.5	95
Birmingham	9	0	55	85.5
Cincinnati	62	+ 2.5*	77.5	84
St. Louis	58	— 1	82	76.5
Detroit	24.5	+ 2*	73.5	89
Western	6	— 2	69.5	98
National Rate	12	+ 0.7*	63.5	82.5

INGOT PRODUCTION

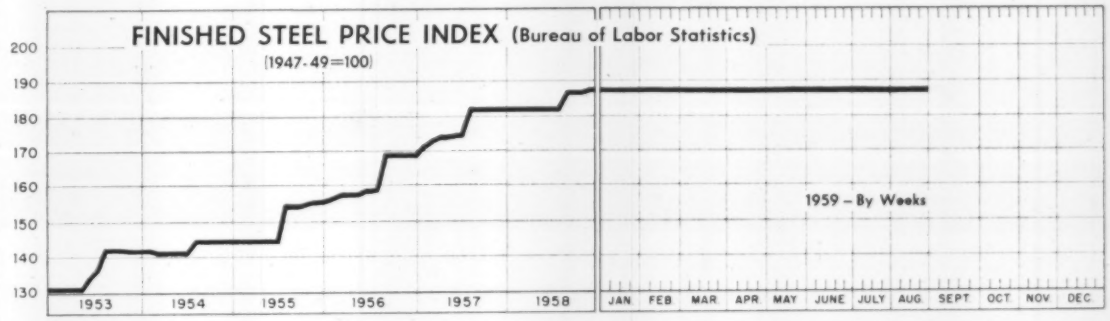
	Week Ended Aug. 30	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	21.2†	20.0	21.5	106.8
NET TONS (In thousands)	340†	321	345	1,715

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Aug. 25, 1959	Week Ago	Month Ago	Aug. Index	Year Ago
186.7	186.7	186.7	186.7	186.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 25

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.615
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.253
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.722
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 26 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	246.65	194.19
Index in cents per lb	6.713	6.713	6.713	6.682	5.261

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.28	$117.77
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	38.33	38.33	38.67	41.67	29.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 26 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.00
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Aug. 26 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	49.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld., Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$38.50	$38.50	$39.50	$42.50	$29.50
No. 1 Heavy Melt, E. Pa.	40.00	40.00	40.00	39.00	27.50
No. 1 Heavy Melt, Chicago	36.50	36.50	36.50	43.50	30.00
No. 1 Heavy Melt, Valley	41.50	41.50	41.50	43.50	30.50
No. 1 Heavy Melt, Cleve.	38.50	38.50	38.50	40.00	28.50
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	34.50	26.50
Rails, Rerolling, Chicago	61.50	61.50	59.50	64.50	44.50
No. 1 Cast, Chicago	53.50	53.50	52.50	45.50	35.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.25	$14.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

Steel Prices

Mill prices as reported to STEEL, Aug. 26, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 93; footnotes, page 97.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $76.00

INGOTS, Alloy (NT)
Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bartonville,Ill. K4 ..... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 ..... 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 ..... 80.00
S.Duquesne,Pa. U5 ..... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 ..... 104.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 ..... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 ..... 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 ..... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 ..... 99.50
S.Duquesne,Pa. U5 ..... 99.50
S.SanFrancisco B3 ..... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..... $119.00
Bridgeport,Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 ..... 119.00
Conshohocken,Pa. A3 ..... 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 ..... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 ..... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 ..... 119.00
Johnstown,Pa. B2 ..... 119.00
Lackawanna,N.Y. B2 ..... 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 ..... 119.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 ..... 119.00
S.Duquesne,Pa. U5 ..... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2, W14 ..... 122.50
S.Duquesne,Pa. U5 ..... 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 ..... 5.05

WIRE RODS
AlabamaCity,Ala. R2 ..... 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 ..... 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 ..... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 ..... 6.65
Monessen,Pa. P7 ..... 6.40
Pittsburg,Calif. C11 ..... 7.20
Portsmouth,O. P12 ..... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 ..... 6.40
SparrowsPoint,Md. B2 ..... 6.50
Sterling,Ill.(1) N15 ..... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 ..... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1 ..... 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.60
Lackawanna,N.Y. B2 ..... 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 ..... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 ..... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 ..... 5.50
S.SanFrancisco B3 ..... 6.15
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 ..... 6.20
Weirton,W.Va. W6 ..... 5.50

Wide Flange
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 ..... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N15 ..... 5.50
Weirton,W.Va. W16 ..... 5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14 ..... 6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 ..... 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 ..... 8.15
Lackawanna,N.Y. B2 ..... 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14 ..... 8.05
S.SanFrancisco B3 ..... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 ..... 8.05
Lackawanna,N.Y. B2 ..... 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 ..... 5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ..... 6.50
Lackawanna,N.Y. B2 ..... 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 ..... 6.50
Weirton,W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ..... 5.30
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. C22 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 ..... 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 ..... 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 ..... 5.40
Harrisburg,Pa. P4 ..... 5.30
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 ..... 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 ..... 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 ..... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 ..... 5.30
SparrowsPoint,Md. B2 ..... 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 ..... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown (27) R2 ..... 5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ..... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 ..... 7.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. C22 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 ..... 7.95
Conshohocken,Pa. A3 ..... 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 ..... 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 ..... 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 ..... 7.95
SparrowsPoint,Md. B2 ..... 7.95
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 ..... 7.95

PLATES, Alloy
Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. C22 ..... 7.50
Coatesville,Pa. L7 ..... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 ..... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14 ..... 7.50
SparrowsPoint,Md. B2 ..... 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Conshohocken,Pa. A3 ..... 6.375
Ind.Harbor,Ind. I-2 ..... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..... 5.55
Ashland l.c.l.(15) A10 ..... 6.05
Cleveland c.l. R2 ..... 6.05
Warren,O. c.l. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..... 5.675
Aliquippa,Pa. (9) J5 ..... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta (9) A11 ..... 5.875
Bessemer,Ala.(9) T2 ..... 5.675
Birmingham(9) C15 ..... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O. (23) R2 ..... 6.15
Clairton,Pa.(9) U5 ..... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 ..... 5.675
Emeryville,Calif. J7 ..... 6.425
Fairfield,Ala.(9) T2 ..... 5.675
Fairless,Pa.(9) U5 ..... 5.825
Fontana,Calif.(9) K1 ..... 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 ..... 5.675
Johnstown,Pa.(9) B2 ..... 5.675
Joliet,Ill. P22 ..... 5.675
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
LosAngeles(9) B3 ..... 6.375
Massillon,O. (23) R2 ..... 6.15
Midland,Pa.(23) C18 ..... 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Owensboro,Ky.(9) G8 ..... 6.025
Pittsburg,Calif.(9) C11 ..... 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
Riverdale,Ill.(9) A1 ..... 5.675
Seattle A24, B3, N14 ..... 6.425
S.Ch'c'go(9)R2,U5,W14 ..... 5.675
S.Duquesne,Pa.(9) U5 ..... 5.675
S.SanFran.,Calif.(9)B3 ..... 6.425
Sterling,Ill.(1)(9) N15 ..... 5.675
Sterling,Ill.(9) N15 ..... 5.775
Struthers,O.(9) Y1 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675
Torrance,Calif.(9) C11 ..... 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2, U5, ... 5.675

Bars, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Fairless,Pa. U5 ..... 6.875
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 ..... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 ..... 6.725
Johnstown,Pa. B2 ..... 6.725
KansasCity,Mo. S5 ..... 6.975
Lackawanna,N.Y. B2 ..... 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 ..... 6.725
S.Duquesne,Pa. U5 ..... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 ..... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 ..... 8.55
Lackawanna,N.Y. B2 ..... 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 ..... 8.30
S.Duquesne,Pa. U5 ..... 8.30
S.SanFrancisco B3 ..... 9.05
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..... 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9)S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..... 11.75*

Alloy
Ambridge,Pa. W18 ..... 10.175
BeaverFalls,Pa. M12 ..... 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 ..... 10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 ..... 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 ..... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 ..... 7.65
Hartford,Conn. R2 ..... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 ..... 9.10
LosAngeles(49) P2, R2 ..... 9.10
Mansfield,Mass. B5 ..... 8.20
Massillon,O. R2, R8 ..... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 ..... 7.90
Putnam,Conn. W18 ..... 8.20
Readville,Mass. C14 ..... 8.20
S.Chicago,Ill. W14 ..... 7.65
SpringCity,Pa. K3 ..... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 ..... 8.15
Youngstown F3, Y1 ..... 7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 ..... 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ..... 9.025
BeaverFalls,Pa. M12,R2 ..... 9.025
Bethlehem,Pa. B2 ..... 9.025
Bridgeport,Conn. C32 ..... 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 ..... 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 ..... 9.025
Hammond,Ind. J5, L2 ..... 9.025
Hartford,Conn. R2 ..... 9.325
Harvey,Ill. R5 ..... 9.025
Lackawanna,N.Y. B2 ..... 9.025
LosAngeles P2, S30 ..... 11.00
Mansfield,Mass. B5 ..... 9.325
Massillon,O. R2, R8 ..... 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 ..... 9.225
S.Chicago,Ill. W14 ..... 9.025
SpringCity,Pa. K3 ..... 9.20
Struthers,O. Y1 ..... 9.025
Warren,O. C17 ..... 9.025
Waukegan,Ill. A7 ..... 9.025
Willimantic,Conn. J5 ..... 9.325
Worcester,Mass. A7 ..... 9.325
Youngstown F3, Y1 ..... 9.025

BARS, Reinforcing, Billet (To Fabricators)

Alabama City Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse, Mich. G5 .....5.675
Emeryville, Calif. J7 ...6.425
Fairfield, Ala. T2 ....5.675
Fairless, Pa. U5 .....5.825
Fontana, Calif. K1 ....6.375
Ft. Worth, Tex (4) (26) T4 5.925
Gary, Ind. U5 .....5.675
Houston S5 .....5.925
Ind. Harbor, Ind. I-2, Y1 5.675
Johnstown, Pa. B2 ....5.675
Joliet, Ill. P22 .....5.675
Kansas City, Mo. S5 ...5.925
Kokomo, Ind. C16 ....5.775
Lackawanna, N.Y. B2..5.675
Los Angeles B3 .....6.375
Madison, Ill. L1 .....5.875
Milton, Pa. M18 .....5.825
Minnequa, Colo. C10 ..6.125
Niles, Calif. P1 .....6.375
Pittsburg, Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland Oreg. O4 ....6.425
Sand Springs, Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S. Chicago, Ill. R2, W14 5.675
S. Duquesne, Pa. U5 ....5.675
S. San Francisco B3 ....6.425
Sparrows Point, Md. B2..5.675
Sterling, Ill. (1) N15 ...5.675
Sterling, Ill. N15 .....5.775
Struthers, O. Y1 .....5.675
Tonawanda, N.Y. B12 ..6.10
Torrance, Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown, Pa. B2 .....7.33
Kansas City, Mo. S5 ....7.60
Lackawanna, N.Y. B2 ..7.35
Marion O. P11 .....6.70
Newark, N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Sand Springs, Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
Sparrows Pt., Md. B2 ..7.33
St. Paul U8 .....8.17
Williamsport, Pa. S19 ..7.25

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 14.90
Economy, Pa. (D.R.) B14 18.55
Economy (Staybolt) B14 19.00
McK. Rks. (S.R.) L5 ..14.50
McK. Rks. (D.R.) L5 ..19.80
McK. Rks. (Staybolt) L5 20.95

BARS, Rail Steel

Chicago Hts. (3) C2, I-2 5.575
Chicago Hts. (4) (44) I-2 5.675
Chicago Hts. (4) C2 ....5.675
Franklin, Pa. (3) F5 ..5.575
Franklin, Pa. (4) F5 ..5.675
Jersey Shore, Pa. (3) J8 ..5.55
Marion, O. (3) P11 ....5.575
Tonawanda (3) B12 ....5.575
Tonawanda (4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Alabama City, Ala. R2 ..5.10
Allenport, Pa. P7 .....5.10
Aliquippa, Pa. J5 .....5.10
Ashland Ky. (8) A10 ..5.10
Cleveland J5, R2 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Fairless, Pa. U5 .....5.15
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Geneva, Utah C11 .....5.20
Granite City, Ill. (8) G4 ..5.20
Ind. Harbor, Ind. I-2, Y1 5.10
Irvin, Pa. U5 .....5.10
Lackawanna, N.Y. B2 ..5.10
Mansfield, O. E6 .....5.10
Munhall, Pa. U5 .....5.10
Newport, Ky. A2 .....5.10
Niles, O. M21, S3 .....5.10
Pittsburg, Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth, O. P12 ....5.10
Riverdale, Ill. A1 .....5.10
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. U5, W14..5.10
Sparrows Point, Md. B2 ..5.10
Steubenville, O. W10 ....5.10
Warren, O. R2 .....5.10
Weirton, W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles, O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary, Ind. U5 .....8.40
Ind. Harbor, Ind. Y1 ....8.40
Irvin, Pa. U5 .....8.40
Munhall, Pa. U5 .....8.40
Newport Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low Alloy

Aliquippa, Pa. J5 .....7.525
Ashland, Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.525
Fairfield, Ala. T2 .....7.525
Fairless, Pa. U5 .....7.575
Farrell, Pa. S3 .....7.525
Fontana, Calif. K1 ....8.25
Gary, Ind. U5 .....7.525
Ind. Harbor, Ind. I-2, Y1 7.525
Irvin, Pa. U5 .....7.525
Lackawanna (35) B2 ..7.525
Munhall, Pa. U5 .....7.525
Niles, O. S3 .....7.525
Pittsburgh J5 .....7.525
S Chicago Ill. U5, W14 7.525
Sharon, Pa. S3 .....7.525
Sparrows Point (36) B2..7.525
Warren, O. R2 .....7.525
Weirton, W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky. (8) A10 ..5.35
Cleveland R2 .....5.875
Warren, O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown, O. A10 ....6.775
Warren, O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Alabama City, Ala. R2 .6.275
Aliquippa, Pa. J5 .....6.275
Allenport, Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken, Pa. A3..6.325
Detroit M1 .....6.275
Ecorse, Mich. G5 .....6.275
Fairfield, Ala. T2 .....6.275
Fairless, Pa. U5 .....6.325
Follansbee, W.Va. F4 ..6.275
Fontana, Calif. K1 ....7.40
Gary Ind. U5 .....6.275
Granite City, Ill. G4 ....6.375
Ind. Harbor, Ind. I-2, Y1 6.275
Irvin, Pa. U5 .....6.275
Lackawanna, N.Y. B2..6.275
Mansfield, O. E6 .....6.275
Middletown, O. A10 ....6.275
Newport, Ky. A2 .....6.275
Pittsburg, Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth, O. P12 ....6.275
Sparrows Point, Md. B2 6.275
Steubenville, O. W10 ..6.275
Warren, O. R2 .....6.275
Weirton, W.Va. W6 ....6.275
Yorkville, O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse, Mich. G5 .....9.275
Fairless, Pa. U5 .....9.325
Fontana Calif. K1 ....10.40
Gary, Ind. U5 .....9.275
Ind. Harbor, Ind. I-2, Y1 9.275
Lackawanna (37) B2 ..9.275
Pittsburgh J5 .....9.275
Sparrows Point (38) B2..9.275
Warren, O. R2 .....9.275
Weirton, W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala. City, Ala. R2	7.225	....
Ashland, Ky. A10	7.225	7.475
Canton, O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary, Ind. U5	7.225	7.475
Granite City, Ill. G4	7.325	....
Ind. Harbor I-2	7.225	7.475
Irvin, Pa. U5	7.225	7.475
Kokomo, Ind. C16	7.325	....
Martins Fry. W10	7.225	7.475
Pitts., Calif. C11	7.975	....
Pittsburgh J5	7.225	....
Sparrows Pt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind. Harbor, Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

Alabama City, Ala. R2 .6.875‡
Ashland, Ky. A10 ....6.875‡
Canton O. R2 .....6.875‡
Dover, O. E6 .....6.875†
Fairfield, Ala. T2 ....6.875†
Gary, Ind. U5 .....6.875†
Granite City, Ill. G4 ...6.975*
Ind. Harbor, Ind. I-2 ..6.875†
Irvin, Pa. U5 .....6.875‡
Kokomo, Ind. C16 ....6.975‡
Martins Ferry, O. W10 6.875*
Middletown, O. A10 ....6.875‡
Pittsburg, Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
Sparrows Pt., Md. B2 ..6.875†
Warren, O. R2 .....6.875†
Weirton, W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana, Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin, Pa. U5 .....10.125
Pittsburgh J5 .....10.125
Sparrows Pt. (39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton, O. R2 .....7.275
Irvin, Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland Ky. A10 .....7.125
Middletown, O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland (28) B2 .....7.65
Niles, O. (28) R2 .....7.65
Weirton, W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 9.525
Butler, Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland, Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield, Ala. T2 ....6.775
Gary, Ind. U5 .....6.775
Granite City, Ill. G4 ....6.875
Ind. Harbor, Ind. I-2, Y1 6.775
Irvin, Pa. U5 .....6.775
Middletown, O. A10 ....6.775
Niles, O. M21, S3 ....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover, O. E6 .....8.70
Follansbee, W.Va. F4 ..8.70
Ind. Harbor Ind. I-2 ....8.70
Mansfield, O. E6 .....8.70
Warren, O. R2 .....8.70
Yorkville, O. W10 .....8.70

SHEETS, Long Terne, (Commercial Quality)

Beech Bottom, W.Va. W10 7.225
Gary, Ind. U5 .....7.225
Mansfield, O. E6 .....7.225
Middletown, O. A10 ....7.225
Niles, O. M21, S3 .....7.225
Warren, O. R2 .....7.225
Welton, W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman & Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S. & W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary Ind. U5	7.575
Ind Harbor Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O R2 T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. C18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	....	....	18.85	22.95	27.80
Buffalo W12	....	....	18.85	....	....
Fostoria,O. S1	....	....	19.05	22.15	....
FranklinPark,Ill. T6	....	....	19.20	23.30	28.15
Harrison,N.J. C18	....	....	18.85	22.95	27.80
NewYork W3	....	....	18.85	22.95	27.80
Palmer,Mass. W12	....	....	18.85	....	....
Trenton,N.J. R5	....	....	18.85	22.95	27.80
Worcester,Mass. A7, T6	....	....	18.85	22.95	27.80
Youngstown S41	....	....	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per lb)

IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10 40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity Ill, G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12 40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt. Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10 00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10 05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass.A7,J4,T6	10 05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16 30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa Colo. C10	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16 50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Are You Getting What You Pay For?

When you pay for HIGH QUALITY high-carbon wire, you want to be sure you get it. You do, when it is supplied by Roebling.

It is unsurpassed in quality, consistently true to specifications, and absolutely uniform in gauge. Hundreds of manufacturers attest to this fact . . . the qualities that they *pay* for—they *get* in Roebling high-carbon wire. The length of our relationship with customers proves it.

We'll be glad to show you what we mean. For information on superior high-carbon wire or cold rolled strip, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

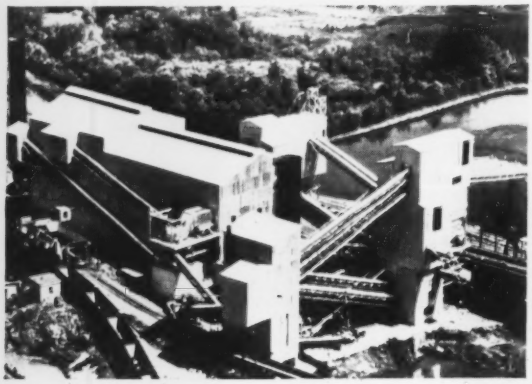
This lightweight "No Charge" spool is typical of Roebling's modern packaging methods that save customers time and money.

ROEBLING

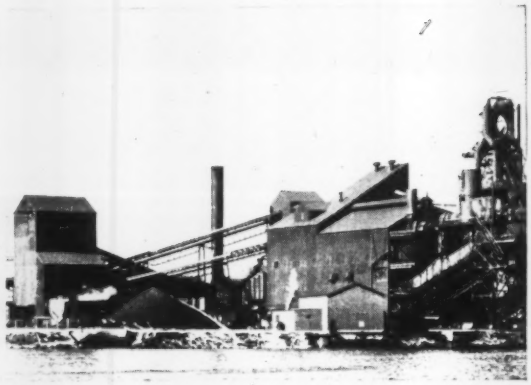
Branch Offices in Principal Cities—Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

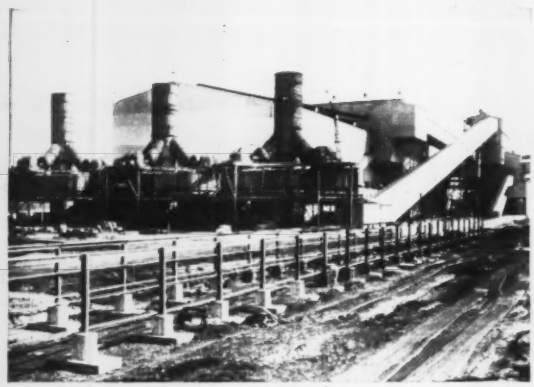
First these:



ARMCO



McLOUTH



GARY

SAXONBURG

and now:

THE WORLD'S LARGEST SINTER MACHINE

Sinter machine width: 13′ 2″

Sinter machine length: 184′

Sinter machine area: 2419 sq. ft.

Engineering constructor—Dravo Corporation

For: Jones & Laughlin Steel Corporation, at Aliquippa, Pennsylvania

DRAVO

CORPORATION

PITTSBURGH 22, PA.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
Franklin Park,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) to Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler
(14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.24

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.54

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.59

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa. 9-11½ga. J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality

	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	9.10	9.775§
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(1)(48)N15	9.00	9.70††
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras. §§11.50c.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1¼ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts
(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy
Hot Pressed & Cold Punched:

⅜ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

⅜ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
½ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
½ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:
6 in. and shorter:

½ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0

Longer than 6 in.:

½ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¼ in. and smaller, 6 in. and shorter	+ 85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:	
6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85, 7/16 in. and smaller by 6 in. and shorter: 15% off list.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2½	12	58.73	68.83	52.13
2¾	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mills bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c or cut lengths, 72" and narrower.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown B2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling: Ingot	Rerolling: Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	H.R. Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36 00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39 00	42.25	44.50	40.00	49.25	49.25
301	24 00	26.00	38.75	37 25	43.50	46 00	41.25	51.25	47.50
302	26 25	29.50	39.50	40.50	44.25	46 75	42 25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42 50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47 00	49.50	45.75	55.00	55.00
304L	....	....	....	49.75	51.50	54 75	57.25	53.50	62.75	62 75
305	29.50	34.75	44.00	47 50	47 00	49.50	46.25	58.75	58.75
308	32.00	36 25	49.00	50.25	54.75	57 75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94 50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94 50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80 75
316L	....	....	72.25	76.25	79 50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57 50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26 50	30 75	36.00	34 75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc., Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: 20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base: Cold Rolled 10%	Strip, Carbon Base: Cold Rolled Both Sides
Copper*	$35.85	$42.50

*Deoxidized. Production points: Stainless-clad ssheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	.. ..	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon, add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglet, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood Tenn. T3 (Phos. 0.035% max)	73.00
Troy N Y R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max).	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.06	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	10.07	11.42	11.92	58.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54(a)	8.79(b)	10.87(a)	52.33	10.32(c)	8.75(d)	11.25#	15.16	9.39	8.71(e)	10.50(f)
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95‡‡	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70‡	10.80‡	12.20	57.60	9.15	9.10‡	12.95‡	16.35	9.00‡	9.10‡	11.30‡
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.74
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New Lork	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54(a)	8.79(b)	10.76(a)	52.33	10.30(c)	8.64(d)	11.25#	15.05	9.00	8.47(e)	10.26(f)
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	.. ..	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80‡	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡⅝ in. to 4 in. wide, inclusive; #net price. 1 in. round C-1018.
(a)10 Ga.; (b)20 Ga.; (c)⅛ x 1 in.; (d)¾-2½ in.; (e)¼ x 84 in.; (f)¼ x 36.
Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; ‡—30,000 lb; §—1000 to 4999 lb; §—1000 to 1999 lb; ‡‡—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa. $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill. $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$12.50-13.00*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 91.5c-96.5c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash

Indian and Rhodesian

48% 3:1	$42.00-44.00†
48% 2.8:1	38.00-40.00†
48% no ratio	26.00-31.00†

South African Transvaal

44% no ratio	19.75-21.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00†

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene, one deg (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00‡
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.25
100 mesh, pails	9.10§
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	36.00
Unannealed (99+% Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16 plus 100 mesh)	29.00
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	33.30-49.50†
Bronze, 5000-lb lots	50.50-54.60†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	51.50-56.00†
Phosphor-Copper, 5000-lb lots	62.80
Copper (atomized) 5000-lb lots	43.30
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium, electrolytic 99.8% Cr. min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scrafing grade. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$6.13*	*$6.13*	*$6.08*	*$5.98*	*$6.44*
Bar Size Angles	*6.13*	*6.13*	*6.08*	*5.98*	*6.44*
Structural Angles	*6.03*	*6.03*	*5.98*	*5.88*	*6.28*
I-Beams	*6.03*	*6.03*	*5.98*	*5.88*	*6.28*
Channels	*6.03*	*6.03*	*5.98*	*5.88*	*6.28*
Plates (basic bessemer)	*5.87*		*5.87*	*5.77*	*6.17*
Sheets, H.R.	7.00	7.00	6.95	6.85	7.25
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.30	9.30	9.25	9.15	9.65
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.45	9.45	9.40	9.30	9.70
Sheets, C.R. (drawing quality)	8.50	8.50	8.45	8.35	8.75
Furring Channels, C.R., 1000 ft. ¾ x 0.30 lb per ft.	25.22	25.06	24.91	24.61	26.28
Barbed Wire (†)	7.15	7.15	7.10	7.00	7.40
Merchant Bars	*6.18*	*6.18*	*6.13*	*6.03*	*6.43*
Hot-Rolled Bands	6.90	6.90	5.95	5.85	6.25
Wire Rods, Thomas Commercial No. 5	6.10	6.10	6.10	6.00	6.35
Wire Rods, O.H.	6.65	6.70	6.65	6.55	6.90
Bright Common Wire Nails (§)	7.65	7.65	7.60	7.50	7.90

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less to.. 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb or briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

Scrap Brokers Remain Confident

Opinion spreads that prolongation of strike means there will likely be a tight supply of metallics during winter months. No. 1 heavy holds for fourth consecutive week

Scrap Prices, Page 104

• **Pittsburgh** — Railroad lists have closed, and bids on industrial scrap haven't been opened, so the market is at a standstill. Premium auto body bundles will probably bring about what they did last month ($45.50), or perhaps $1 less. Prices of most grades are firm, with the greatest strength noted in foundry items. Although No. 1 heavy melting scrap is still quoted at $38-$39 on the basis of the last sale here, recent mill purchases at Youngstown (for delivery after the strike) suggest that Pittsburgh consumers couldn't buy a representative tonnage today for less than $43.

• **Chicago** — Prolongation of the steel strike is strengthening the scrap market, but prices on most steelmaking grades are unchanged. The few mills that are operating are buying sparingly.

Firmness is based on the fact that a long steel strike would restrict the supply of iron ore this winter. That in turn would result in steelmakers using more scrap in their furnace charges. Another stimulant to the market is the move by dealers to accumulate scrap in anticipation of strong demand after the strike is settled.

• **Philadelphia** — Scrap prices are unchanged but confidence in the market remains strong. Contributing mainly to the strength in open hearth grades is the active demand for export tonnages. Cast scrap is steady in the face of strikes at some foundries, including United States Pipe & Foundry Co., Burlington, N. J.

• **New York** — Brokers' buying prices are steady on all grades, including carbon steel, cast iron, and stainless steel specialties. Most trading is in the open hearth grades, principally for export.

• **Buffalo**—Steelmaking scrap prices remain firm despite the lack of local business. Some industrial scrap is moving out of this district to other centers where mills are still operating, eliminating a double handling operation on the part of dealers who otherwise would have to lay it down. Mills are using a relatively high percentage of scrap in their open hearth melts.

The cast scrap continues firm after its recent advance of $2 a ton and dealers predict new sales will be at even higher levels. Foundries are reaching out for cast scrap; supplies are limited.

• **Detroit**—Rumors of an early settlement of the steel strike caused some optimistic talk among scrap interests last week, but there is little evidence that dealers are backing up their conversation with action.

Monthend auto lists showed little change in bid prices and there are still only a few orders out for scrap. The industry apparently has adapted an attitude of watchful waiting which should keep prices fairly stable through September, or until the strike is settled.

• **Youngstown** — The local scrap market remains in the strike doldrums. Incoming scrap to dealers' yards far exceeds outbound material. Dealers are finding it increasingly hard to meet their commitments to take scrap from fabricators. Many are holding out hopes that shortages of metallics resulting from the prolonged steel strike will bail out many dealers this winter.

• **Cincinnati** — Scrap brokers and dealers continue confident that prices are due for a sharp rise after the strike. No distress selling has developed. Principal steelmaking grades are holding firm, and cast grades display new strength on some foundry buying. Reports of a Cleveland-Valley district consumer buying 50,000 tons for poststrike delivery has put zip into the local market. "This kind of report can set the market afire," says a local scrapman.

• **St. Louis**—Since local mills have blocked off shipments, the scrap market is nearly stagnant. There is still a little foundry business, but tonnage volume business is dead. Dealers continue to prepare and process scrap so larger releases can be made when shipments are resumed. Prices are virtually unchanged and are expected to remain firm.

• **Birmingham**—The scrap market continues steady pricewise and active despite the strike. An Atlanta mill returned to the market this week with purchases at unchanged prices. Foundry and electric furnace scrap is becoming scarce and some brokers say orders are getting hard to fill. The supply of cast grades is a little better, but prices are steady.

• **Houston**—The Mexican mill at Monterrey returned to the Texas scrap market for a limited tonnage of No. 1 and No. 2 heavy melting grades and raised its buying prices $2 a ton. On the basis of the new purchase, which calls for delivery during September, Texas brokers are quoting $44 and $41, respectively for the two grades delivered to the border.

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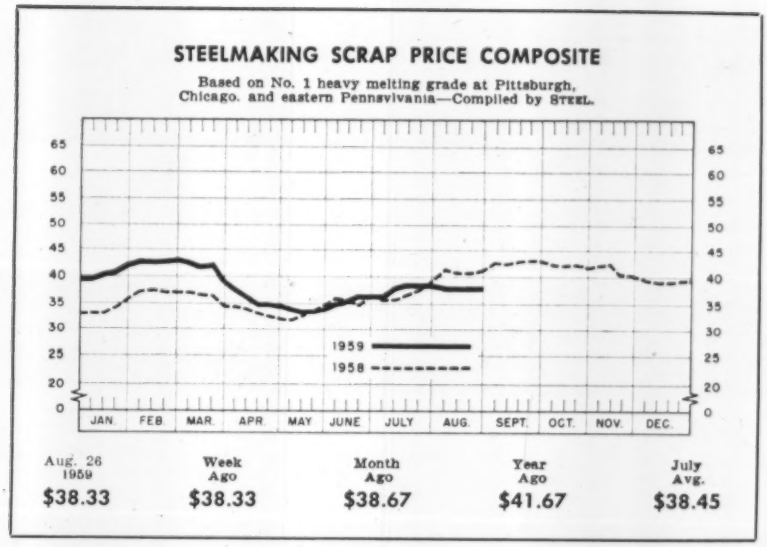


Meanwhile, export demand in western Gulf port centers is preventing any pileup of scrap. Prices range from $37-$38 in Houston to $40 in New Orleans for No. 1 grade delivered shipside.

In Texas, foundry demand and a thin supply are keeping cast prices firm.

• **Seattle**—Scrap dealers are preparing for an active fall turnover. Buying of prepared scrap is at a standstill, but some unprepared is moving. Oriental buyers are negotiating for tonnages: Japanese interests are seeking additional obsolete ships for towing to Far East yards. That procedure gives greater profits than buying scrap on this side and paying freights. The advantage is in substantially lower labor costs in the Orient.

• **San Francisco**—Little steel scrap is arriving here because of a truckers' strike. However, there is little need for shipments because of the slow demand. Export demand is the only sustaining element.

• **Los Angeles**—Scrap prices remain firm. Movement continues to the docks for export, but that is easing considerably.

Rails, Cars . . .

Track Material Prices, Page 97

Domestic freight car buying is down. In July, orders amounted to 4157 cars vs. 8054 in June, says the American Railway Car Institute and the Association of American Railroads. However, volume was well ahead of that of a year ago when July orders totaled only 376 cars.

Deliveries hit 4273 cars in July against 3950 in June and 2113 in July, 1958.

Backlogs as of Aug. 1 showed 20,917 on order in railroad shops and 19,392 in commercial shops, a total of 40,309 cars. That compares with 40,973 on July 1 and 25,994 on Aug. 1, last year.

Forms Shipwrecking Inc.

A group of Birmingham and Cullman, Ala., businessmen have formed a company to conduct a major ship scrapping operation on government and privately owned vessels. Called Shipwrecking Inc., the company has leased a part of the former Gulf Shipbuilding Corp. shipyard at Mobile, Ala.

The first vessel, the *SS Fort Padoussac*, purchased from the Maritime Administration, is being scrapped.

Pig Iron . . .

Pig Iron Prices, Page 99

Foundries are "surprisingly" busy in view of unsettling effects of the steel strike. Prospects are bright for active foundry business for the rest of the year and merchant iron demand should be brisk.

Foundries anticipate a good flow of castings orders from automakers when new model output hits stride. The expanding railroad equipment market also will be calling for larger tonnages of castings.

Blast Furnace Production Drops Sharply in July

Blast furnace production dropped sharply to 3,573,550 tons of pig iron and ferroalloys in July from 7,289,946 tons in June, reports the American Iron & Steel Institute, New York. The industry was struck at midnight July 14, reducing operations for the month to 44.5 per cent of capacity from 93.7 per cent in June.

Total production for the first seven months came to 46,005,474 tons compared with 30,009,189 tons in the like period a year ago. Blast furnaces were operated at 83.7 per cent of capacity through July compared with 56.8 per cent in the like 1958 period.

Production in July and for the first seven months by states follows:

Pig Iron-Ferroalloy Production
(July and First 7 Months, 1959)
(Net tons)

States:	July	Year to Date
Massachusetts, New York	221,506	2,890,793
Pennsylvania	825,172	11,937,567
Maryland, Virginia, West Virgina	410,341	4,086,821
Kentucky, Tennessee, Texas	102,449	1,081,462
Alabama	243,473	2,702,915
Ohio	669,984	8,735,367
Indiana	366,488	5,290,321
Illinois	341,524	3,922,340
Michigan, Minnesota	253,967	2,939,175
Colorado, Utah, California	138,646	2,418,713
Totals	3,573,550*	46,005,474**

*Includes 23,391 tons of ferromanganese and spiegeleisen.
**Includes 342,314 tons of ferromanganese and spiegeleisen.
Data from American Iron & Steel Institute.

Structural Shapes . . .

Structural Shape Prices, Page 92

Structural awards still lag. Various highway projects are tied up by lack of government funds and private work is spotty. Hence, there has been no particular pressure for plain material. However, where new contracts are booked, the fabricators usually don't have some sizes in stock and they must go hunting to fill the gaps. As only a few shape mills are in operation, they often have to turn to distributors for help.

(*Please turn to Page* 109)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Aug. 26, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 26	$38.33
Aug. 19	38.33
July Avg.	38.45
Aug. 1958	41.58
Aug. 1954	28.80

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	34.00-35.00
No. 1 dealer bundles	39.00-40.00
No. 2 bundles	29.00-30.00
No. 1 busheling	41.00-42.00
No. 1 factory bundles	47.00-48.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals:	
2 ft and under	48.00-49.00
3 ft and under	47.00-48.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	52.00-53.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
Rails, 2 ft and under	*58.00-59.00*
Rails, 18 in. and under	*59.00-60.00*
Random rails	*55.00-56.00*
Angles, splice bars	53.00-54.00
Railroad specialties	53.00-54.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	37.00-38.00
No. 1 hvy melt., dealer	35.00-36.00
No. 2 hvy melting	33.00-34.00
No. 1 factory bundles	41.50-42.50
No. 1 dealer bundles	37.00-38.00
No. 2 bundles	24.00-25.00
No. 1 busheling, indus.	37.00-38.00
No. 1 busheling, dealer	35.00-36.00
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*21.00-22.00*
Short shovel turnings	*21.00-22.00*
Cast iron borings	*21.00-22.00*
Cut structurals, 3 ft	48.00-49.00
Punchings & plate scrap	49.00-50.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	50.00-51.00
Unstripped motor blocks	44.00-45.00
Clean auto cast	59.00-60.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
R.R. malleable	59.00-60.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Angles, splice bars	52.00-53.00
Axles	57.00-58.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	110.00-115.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	30.00-31.00
No. 1 busheling	41.00-42.00
No. 1 bundles	42.00-43.00
No. 2 bundles	25.00-26.00
Machine shop turnings	17.00-18.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos	44.00-45.00
Electric furnace bundles	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	43.00-44.00
No. 1 bundles	38.00-39.00
No. 2 bundles	25.00-26.00
No. 1 busheling	38.00-39.00
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	40.00-41.00
Cut structurals, plates 2 ft and under	47.00-48.00
Low phos. punchings & plate	39.00-40.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	39.00-40.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	38.00-39.00
Heavy breakable cast	38.00-39.00
Stove plate	44.00-45.00
Unstripped motor blocks	36.00-37.00
Brake shoes	36.00-37.00
Clean auto cast	52.00-53.00
Burnt cast	37.00-38.00
Drop broken machinery	52.00-53.00

Railroad Scrap

R.R. malleable	65.00-66.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	46.00-47.00
Railroad specialties	48.00-49.00
Uncut tires	42.00-43.00
Angles, splice bars	51.00-52.00
Rails, rerolling	58.00-59.00

Stianless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	33.00
No. 2 heavy melting	31.00
No. 1 bundles	39.00
No. 2 bundles	23.00
No. 1 busheling	37.00
Machine shop turnings	14.00
Short shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	54.00
Charging box cast	45.00
Heavy breakable cast	44.00
Unstripped motor blocks	44.00
Clean auto cast	56.00
Stove plate	*45.50*

Railroad Scrap

No. 1 R.R. heavy melt.	41.00
Rails, 18 in. and under	50.00
Rails, random lengths	45.00
Rails, rerolling	59.00
Angles, splice bars	48.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	38.00-39.00
No. 2 bundles	23.00-24.00
No. 1 busheling	38.00-39.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Bar crops and plates	44.00-45.00
Structurals & plates	43.00-44.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	37.00-38.00
2 ft and under	36.00-37.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	55.00-56.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 18 in. and under	52.00-53.00
Rails, rerolling	57.00-58.00
Rails, random lengths	46.00-47.00
Angles, splice bars	44.00-45.00

PHILADELPHIA

No. 1 heavy melting	40.00
No. 2 heavy melting	35.00
No. 1 bundles	41.00
No. 2 bundles	27.00-28.00
No. 1 busheling	41.00
Electric furnace bundles	42.00
Mixed borings, turnings	20.00†
Short shovel turnings	24.00
Machine shop turnings	20.00
Heavy turnings	34.00
Structurals & plate	43.00-45.00
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	45.00
Drop broken machinery	50.00-51.00
Malleable	67.00-68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-29.00
No. 1 bundles	30.00-31.00
No. 2 bundles	19.00-20.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	12.00-13.00†
Short shovel turnings	13.00-14.00†
Low phos. structurals & plates	36.00-37.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	44.00-45.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.50-36.50
No. 2 heavy melting	30.50-31.50
No. 1 bundles	35.50-36.50
No. 2 bundles	25.00-26.00
No. 1 busheling	35.50-36.50
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	19.00-20.00
Cast iron borings	18.00-19.00
Low phos., 18 in.	*46.00-47.00*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable cast	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	*51.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	*56.00-57.00*
Rails, random lengths	*48.00-49.00*

HOUSTON

(Exporters' buying prices; f.a.s.)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	32.00-33.00
No. 2 bundles	24.00-25.00

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	43.00-44.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable	33.00
Foundry malleable	42.00-43.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	25.00-25.50
No. 1 bundles	28.00-29.00
No. 1 busheling	28.00-29.00
Machine shop turnings	8.50-9.00
Short shovel turnings	11.50-12.00
No. 1 cast	37.00-38.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	38.00-38.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*21.00-22.00*
No. 1 bundles	*33.00-34.00*
No. 2 bundles	21.00-22.00
No. 1 busheling	*30.00-31.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	14.00-15.00

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Stove plate	38.00-39.00
Heavy breakable	39.00-40.00
Unstripped motor blocks	*27.00-28.00*
Charging box cast	39.00-40.00
Clean auto cast	*48.00-49.00*

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	33.00†
No. 1 bundles	27.00†
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

(Delivered to docks)

No. 1 heavy melting	38.00
No. 2 heavy melting	36.00
No. 1 bundles	37.00
No. 2 bundles	19.00
Machine shop turnings	16.00
Shovel turnings	20.00
Cast iron borings	19.00
Cut structurals and plate 1 ft and under	47.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.50

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	33.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

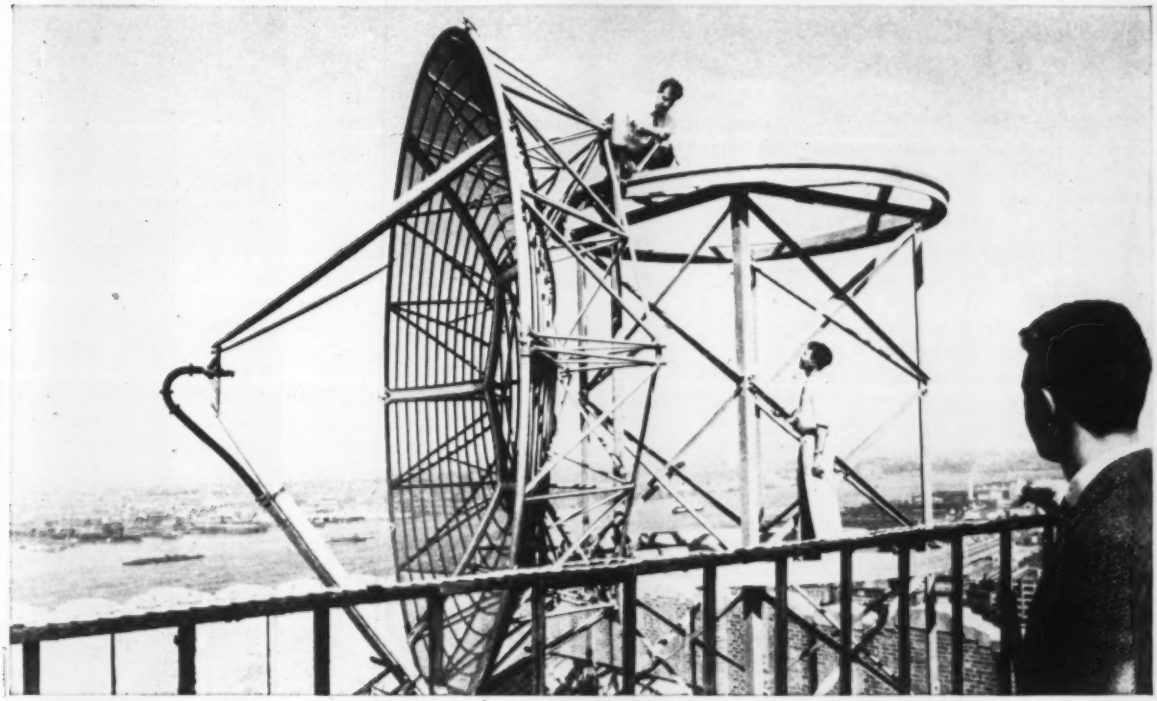
No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	
Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

†Nominal.
‡F.o.b. Hamilton, Ont.

THE U.S. TREASURY SALUTES THE COMMUNICATIONS INDUSTRY



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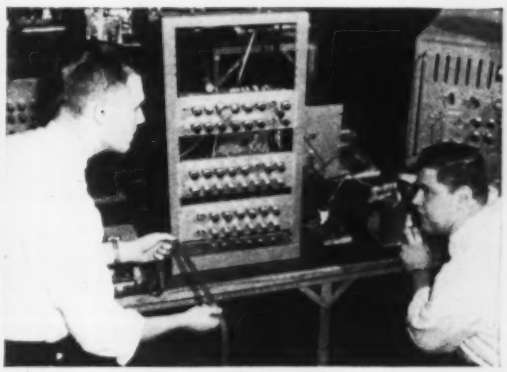


Like so many thousands of their fellow craftsmen in the industry, these young employees are making regular use of their company's Payroll Savings Plan to contribute to America's Peace Power.

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Lead Is Up to 13 Cents

St. Joe's move is first reaction to labor shutdown of 60 per cent of lead and 75 per cent of copper facilities. Tariff Commission to study lead-zinc situation

Nonferrous Metal Prices, Pages 108 & 109

IN THE MIDST of strike-caused nervousness in the nonferrous metal industry, St. Joseph Lead Co. was kicking up its heels last week. The country's largest miner of lead jacked the price by 1 cent to 13 cents a pound (New York basis) on Aug. 24. It marks the first movement in lead since May 7 and the highest the price has been since Oct. 14, 1958.

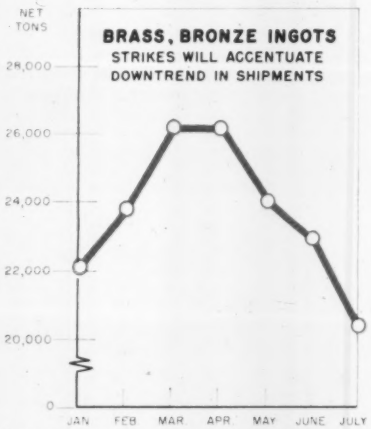
The action followed two weeks of hectic buying by such major users as battery makers, cable manufacturers, and tetraethyl lead producers.

• **Behind the Upswing** — Buyers' appetites were merely whetted by labor walkouts which shut down 60 per cent (30,000 tons a month) of domestic primary output. Consumers that had been getting their supplies from American Smelting & Refining Co., Anaconda Co., and U. S. Smelting, Refining & Mining Co., turned to the few remaining operating producers. In St. Joe's case, the flurry caused sales to exceed production. Many orders had to be filled from stocks accumulated at a higher price, the situation which sparked the 1 cent a pound advance.

Some large consumers of lead are entering their traditional busy season, but future needs, more than current consumption, have spurred buyers to plunk down cash. They fear: 1. A long strike at mines and smelters now shut down. 2. More labor troubles, particularly at facilities of the country's second largest miner, Bunker Hill Co.

• **How They're Set**—Even with all the hedge buying, users' inventories are only fair. Lead in warehouses and on consignment will help ease the bite; so will output from secondary smelters, which are mostly unaffected by labor troubles. Since imports are limited by quotas, there's little hope of help from that source. Outlook: Major users are covered through most of September (perhaps a little longer). After that, things will get a little tight if the strike continues.

The consensus among informed metalmen is that you've seen the last price hike in lead for a while. They look for quotations to hold at least until there's some break on the labor front.



Source: Council of the Ingot Brass & Bronze Industry

• **Zinc Steady**—Zinc prices aren't likely to fluctuate while workers are on the picket line. But as soon as steel settles, look for the price to jump—probably 1 cent a pound.

So far, few zinc facilities have been hit by labor difficulties. In time, the lead strike will affect zinc supply as the availability of zinc fume (a byproduct in the smelting of lead) is slowly choked off. But a squeeze is still remote.

• **Copper Paralyzed**—Operations of major copper producers—Kennecott, Anaconda, Phelps Dodge, American Smelting, Magma, and San Manuel—are virtually at a standstill. Only at a few locations are operations still underway. Shut down: About 75 per cent (or 95,000 out of 130,000 tons monthly) of domestic primary production. If talks between American Metals Climax Co. Inc. and the union bog down, an additional 150,000 tons of annual smelter output will be closed.

• **Also Affected** — Production of gold, silver, cadmium, bismuth, tellurium, thallium, selenium, and the platinum metals will be curtailed as a result of the walkouts.

More Tariff Studies

Producers and fabricators of lead and zinc and their friends in Congress have dictated that there will be few idle moments in the halls and hearingrooms of the Tariff Commission during the fall and winter months. A speedily passed Senate resolution directs the commission to make a comprehensive study, including public hearings, of the whole lead-zinc situation and to report back to Congress with any recommendations for relief no later than Mar. 31, 1960.

NONFERROUS PRICE RECORD

	Aug. 26 Price	Last Change	Previous Price	July Avg	June Avg	Aug., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	30.00	Aug. 7, 1959	29.50-30.00	30.048	31.490	26.510
Lead	12.80	Aug. 24, 1959	11.80	11.800	11.800	10.646
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	102.875	Aug. 26, 1959	103.00	102.298	104.284	94.995
Zinc	11.00	Feb. 25, 1959	11.50	11.000	11.000	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 15, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.30 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 30.00 deld.; custom smelters, 30.00 nom.; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $230-232 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.875.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.00; special high grade, 12.25 deld. Diecasting alloy ingot No. 3, 14.00; No. 2, 14.50; No. 5, 14.25 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.00; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass No. 115, 29.25; tin bronze, No. 225, 39.75; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.895, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.875, f.o.b. Temple, Pa.

COPPER WIRE

Bars, soft, f.o.b. eastern mills, 20,000-lb lots, 35.355; l.c.l., 35.98. Weatherproof, 20,000-lb lots, 36.29; l.c.l., 37.04.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.75-24.25; No. 2 heavy copper and wire, 21.75-22.25; light copper, 19.75-20.25; No. 1 composition red brass, 18.00-18.50; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES e (Based on copper at 30.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	26.000	26.00	25.250
Yellow Brass	47.24	32.81d	47.78	50.65	19.625	18.250	17.750
Low Brass, 80%	50.03	47.97	50.57	53.34	22.000	21.750	21.250
Red Brass, 85%	51.02	50.96	51.56	54.33	22.875	22.625	22.125
Com. Bronze, 90%	52.55	52.49	53.09	55.61	23.875	23.625	23.125
Manganese Bronze	55.65	49.24	59.74	....	18.375	18.125	17.500
Muntz Metal	49.95	45.26	....	....	18.375	18.125	17.625
Naval Brass	51.90	45.71	58.46	55.31	18.250	18.000	17.500
Silicon Bronze	59.23	58.42	58.77	76.89	25.500	25.250	24.500
Nickel Silver, 10%	62.85	65.17	65.17	....	24.500	24.250	12.250
Phos. Bronze	73.92	74.42	74.42	75.60	27.125	26.875	25.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 16.50-17.00; new brass clippings, 14.75-15.25; light brass, 11.50-12.00; heavy yellow brass, 12.50-13.00; new brass rod ends, 12.75-13.25; auto radiators, unsweated, 13.75-14.25; cocks and faucets, 14.25-14.75; brass pipe, 14.25-14.75.

Lead: Soft scrap lead, 8.50-9.00; battery plates, 4.50-4.75; linotype and stereotype, 10.00-10.50; electrotype, 8.25-8.75; mixed babbitt, 9.25-9.75.

Monel: Clippings, 30.00-32.00; old sheets, 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.25-3.50; new diecast scrap, 3.00-3.25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 11.50-12.00; clean borings and turnings, 7.25-7.75; segregated low copper clips, 14.75-15.25; segregated high copper clips, 14.25-14.75; mixed low copper clips, 15.00-15.50; mixed high copper clips, 12.25-12.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.75-13.25; clean borings and turnings, 10.00-10.50; segregated low copper clips, 17.25-17.75; segregated high copper clips, 16.25-16.75; mixed low copper clips, 16.50-17.00; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 25.75; No. 2 heavy copper and wire, 23.75; light copper, 21.75; refinery brass (60% copper) dry copper content, 23.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.75; No. 2 heavy copper and wire, 23.75; light copper, 21.75; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.50; yellow brass turnings, 14.50; radiators, 16.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.30.

Copper: Flat-rolled, 46.29; oval, 44.50, 5000-10,000 lb; electrodeposited, 36.00, 2000-5000 lb lots; cast, 41.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.30 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 14.95; 2000-5900 lb, 12.95; 6000-11,900 lb, 12.70; 12,000-22,900 lb, 12.45; 23,000 lb or more, 11.95.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.

Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 103*)

Hugh Roberts, secretary, Perini Corp., Framingham, Mass., with $125 million of construction work in process, reports no delays from a steel shortage.

Bulk of the 6000 tons of structurals for Connecticut highway bridges is now on fabricating shop books, following an order unfreezing the tonnage. Contracts had been held up pending federal financing. No construction projects underway in New England are held up due to steel shortage, but new starts may be delayed. On those, steel should be in fabricating shops in three to five months and should be delivered to building sites in six to nine months.

Wide flange sections are more difficult to obtain than standard shapes. Fabricators can obtain little relief from importers on those sections as sizes are limited and deliveries on such as they have are extended. Some change may develop in the situation after the turn of the year, however, as some European mills have plans underway for expanding their structural shape capacity.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1000 tons, including reinforcing bars, Central Intelligence Agency headquarters building, Langley Field, Va., to Atlas Machine & Iron Works Inc., Arlington, Va. (structurals), and Sweets Steel Co., Philadelphia (reinforcing); Charles H. Tompkins Co., Washington, and J. A. Jones Construction Co., Charlotte, N. C., joint general contractors.

950 tons, state highway structures, Monroe County, New York, to American Bridge Div., U. S. Steel Corp., Pittsburgh; H. L. Baugham Inc., Rochester, N. Y., general contractor.

890 tons, bridge, Route 55, Section 22, KHF-2, DuPage County, Illinois, to Vierling Steel Works, Chicago.

900 tons, estimated, including reinforcing, federal office building and court house, Portsmouth, Va., to Globe Iron Construction Co., Norfolk (structurals), and Hall-Hodges Co. Inc., Norfolk (reinforcing); Virginia Engineering Co., Newport News, Va., general contractor.

860 tons, Cougar Dam, Oregon, to unstated interest; Merritt-Chapman & Scott, New York, general contractor.

600 tons, state prison buildings, Raiford, Fla., to Birmingham Ornamental Iron Co., Birmingham; Thompson & Street Co., Atlanta, general contractor.

250 tons, including reinforcing, student center, Trinity College, Hartford, Conn., to City Iron Works, Wethersfield, Conn., (structurals) and Scherer Steel Co., Hartford (reinforcing); Wadhams & May Co., Hartford, general contractor.

235 tons, Naval Supply Center, Oakland, Calif., to Isaacson Iron Works, Seattle.

190 tons, new engineering building, S & C Electric Co., Chicago, to Vierling Steel Works, Chicago.

170 tons, including reinforcing bars, tower and terminal building, airfield, Bridgeport, Conn., to New England Iron Works, New Haven, Conn.; John Zandenella Inc., Bridgeport, general contractor.

167 tons, office building, St. Paul Fire & Marine Insurance Co., St. Paul, to St. Paul Foundry Co.; Johnson, Drake & Piper Co., Minneapolis, general contractor.

150 tons, 3-span composite WF beam bridge, Concord, Vt., to Vermont Structural Steel Co., Burlington, Vt.; Olson Construction Co., Montpelier, Vt., general contractor; 50 tons, reinforcing bars, to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, state highway bridge, Newcastle, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Wyman & Simpson Inc., Augusta, Maine, general contractor; 85 tons, steel H-piles and 40 tons, reinforcing bars to same fabricator.

100 tons, state highway structures, Hopkinton, N. H., to West End Iron Works, Cambridge, Mass.; J. F. White Contracting Co., Westwood, Mass., general contractor; 140 tons, reinforcing bars, to New Hampshire Structural Co.

STRUCTURAL STEEL PENDING

10,000 tons, addition, Smithsonian Institution, Washington; Norair Engineering Co., that city, general contractor, low on base bid of $23,788,680.

1825 tons, five state highway bridges, Seymour, Conn.; also 995 tons, concrete reinforcing bars, and 395 tons, steel piles; bids Sept. 8.

1410 tons, nine highway structures, Newton,

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Grinding Capacity

Have extra-fine grinding capacity and will custom grind ores such as Iron, Manganese, Chrome, Zirconium, etc., to buyer's specifications.

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Three used automatic conductor pipe machines in good condition for 3" and 4" plain round and corrugated pipe and 3" square pipe—priced right.

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METALLURGICAL ENGINEER for high carbon wire mill. Minimum three years' experience. Work involves manufacturing processes, problems and product responsibility. Will be in direct charge of junior engineer. Address J. A. Turner, John A. Roebling's Sons Division, The Colorado Fuel and Iron Corporation, 640 So. Broad St., Trenton 2, N. J., giving age, experience, education and salary requirements.

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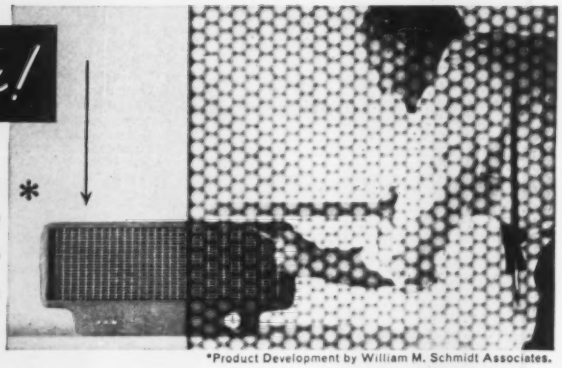
Idea!

mock-up projects design



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Conn.; also 665 tons, concrete reinforcing bars, and 375 tons, mat reinforcement; bids Sept. 8.

650 tons, Public School No. 274, Brooklyn, N. Y.; bids Sept. 9.

350 tons, Public School No. 128, Manhattan, N. Y.; bids Sept. 10.

300 tons, dormitory wing, Marymount College, Tarrytown, N. Y.; bids asked.

290 tons, two 4-span composite wide flange beam bridges, Brattleboro - Dummerston - Putney, Vt.; Perini Corp., Framingham, Mass., low; also 635 tons, concrete reinforcing bars.

200 tons, Public School No. 23, Brooklyn, N. Y.; bids Sept. 15.

165 tons, widening eight bridges, Wakefield, Mass.; Continental Construction Co., Malden, Mass., low, general contract; also 150 tons, reinforcing bars.

150 tons, powerhouse, Sitka, Alaska; bids Sept. 1; Carey & Kramer, Seattle, engineers.

140 tons, rolled girder bridge, Norwich, Conn.; Bingham & Chilkott, Eastford, Conn., low, general contract.

Unstated tonnage, Mercy High School, Riverhead, N. Y.; bids Sept. 9.

REINFORCING BARS . . .

REINFORCING BARS PLACED

33,000 tons, Wanapum Dam, Columbia River, to Gilmore-Skoubye Co., San Francisco; Morrison-Knudsen Inc. and associates, general contractors for Grant County Public Utility Department, Ephrata, Wash.

2750 tons, underground garage, Rochester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Perini Corp., Framingham, Mass., general contractor.

2750 tons, North Shore project, Ice Harbor, to Northwest Steel Rolling Mills Inc., Seattle; Guy F. Atkinson Co., South San Francisco, general contractor.

1800 tons, office building, St. Paul Fire & Marine Insurance Co., St. Paul to United States Steel Supply Div., U. S. Steel Corp., Pittsburgh; Johnson, Drake & Piper Co., Minneapolis, general contractor.

1225 tons, Cougar Dam, Oregon, to unstated interest; Merritt-Chapman & Scott, New York, general contractor.

1180 tons, state prison buildings, Raiford, Fla., to Florida Steel Products Inc., Jacksonville, Fla.; Thomason & Street Co., Atlanta, general contractor.

485 tons, state highway structures, Monroe County, New York, to Whitacre Construction Specialties Co., Rochester, N. Y.; H. L. Baugham Inc., Rochester, general contractor.

400 tons, women's residence, University of Washington, to Soule Steel Co., Seattle; Wick Construction Co., that city, general contractor.

300 tons, building, General Tire Co., Mayfield, Ky., to Steel Service Co., Nashville, Tenn.; Foster & Creighton Co., Nashville, general contractor; structural steel, 52 tons, to Fischer Steel Corp.

REINFORCING BARS PENDING

1050 tons, Everett-Hopkinton, N. H., dam project; bids about Nov. 1, U. S. Engineer, Portland, Maine.

900 tons, Bayview Manor, Seattle; Cawdrey-Vemo Co., that city, general contractor.

325 tons, General Stores Supply, Navy, Philadelphia; bids Sept. 21.

172 tons, dormitory Ft. Greeley, Alaska; Peter Kiewit Sons Co., Seattle, low, $1,261,790, for basic contract.

PLATES . . .

PLATES PLACED

770 tons, Cougar Dam, Oregon, to unstated interest; Merritt-Chapman & Scott, New York, general contractor.

560 tons, sheet piling, for harbor improvements, Public Docks Commission, Portland, Oreg., to unstated interest.

420 tons, carbon, galvanized plates, General Stores Supply, Navy, Philadelphia, to Enterprise Galvanizing Co., Philadelphia.

160 tons, alloy, Grade Hy-80, Naval Supply Center, Oakland, Calif., to Lukens Steel Co., Coatesville, Pa.

100 tons, alloy, General Stores Supply, Navy, Philadelphia, to U. S. Steel Corp., Pittsburgh; 180 tons, strapping, Acme Steel Co., Chicago; 130 tons, strapping, Signode Steel Strapping Co., Chicago.

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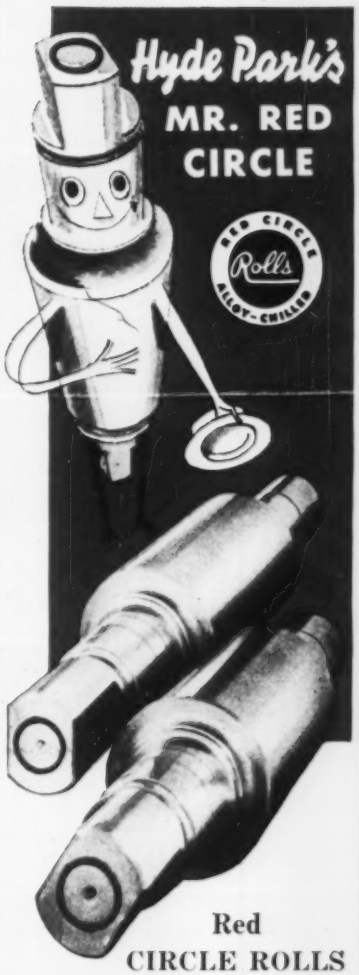

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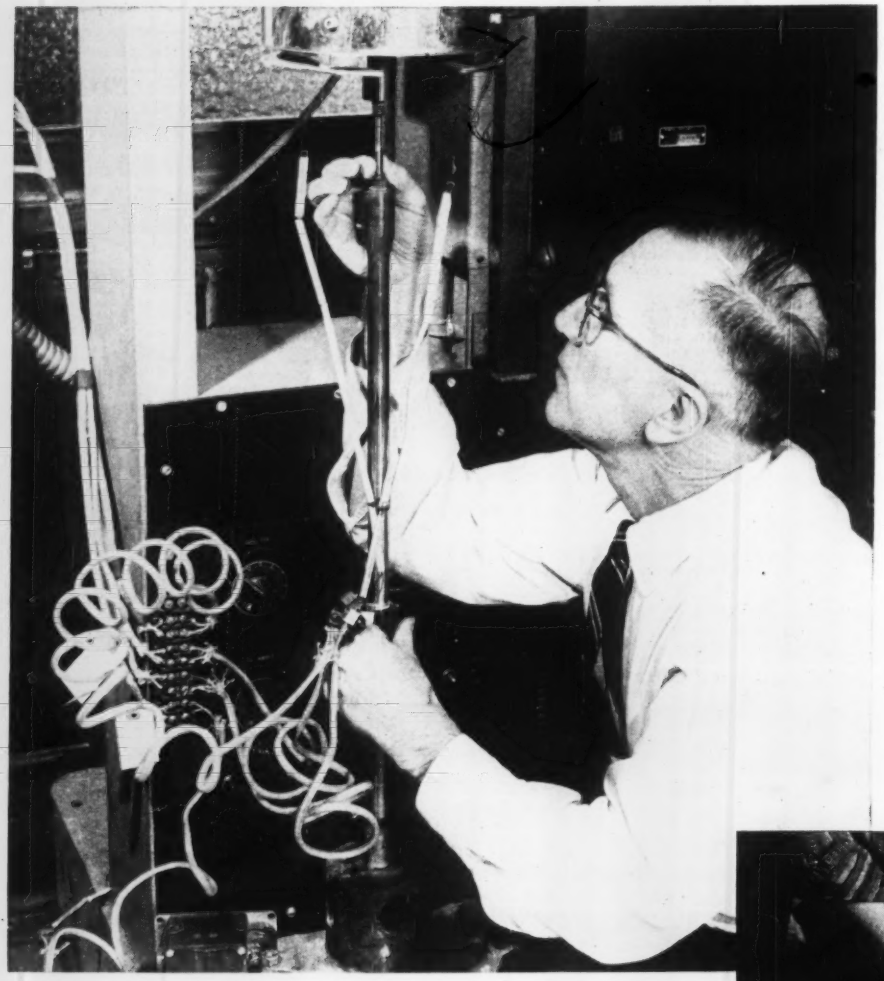
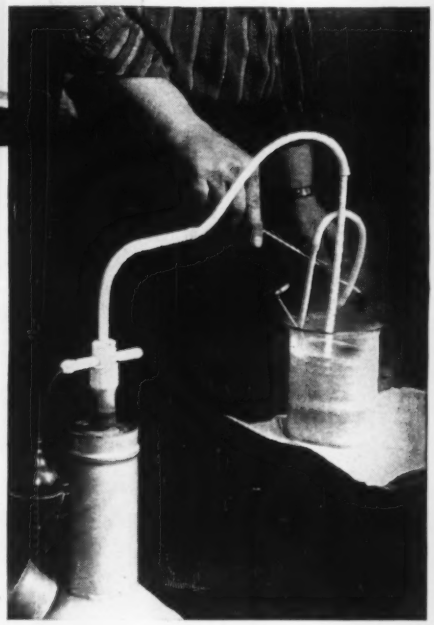


Physical tests at Standard include those for special properties of steel alloys under extreme variations in temperature. Here, the strength and ductility of steel are being checked for resistance to stress under severe conditions of elevated temperatures over a prolonged period of time.

Charpy impact and transition temperature determinations have recently assumed importance in many applications. Here a steel sample is immersed in liquid nitrogen to determine its susceptibility to fracture at temperatures as low as −300°F.



Quality control—a vital activity at Standard Steel Works

Every conceivable shop and laboratory test required for modern quality control can be performed by Standard's staff of metallurgical technicians. Testing of incoming raw materials; physical property tests of steel and other alloys at temperatures from several hundred degrees below zero up to red heat; gas analysis, ultrasonic, X ray, magnetic particle, fluorescent penetrant and microscopic examination of finished products are routine checks which assure that the finished, delivered product will meet the most rigid specifications. Write Department 2-H for full details.

Standard Steel Works Division

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ROTOBLAST CUTS CLEANING TIME 42%

Pangborn Rotoblast reduces cleaning time from 12-15 minutes per 2,000 lb. load to 7 minutes at Ingersoll-Rand

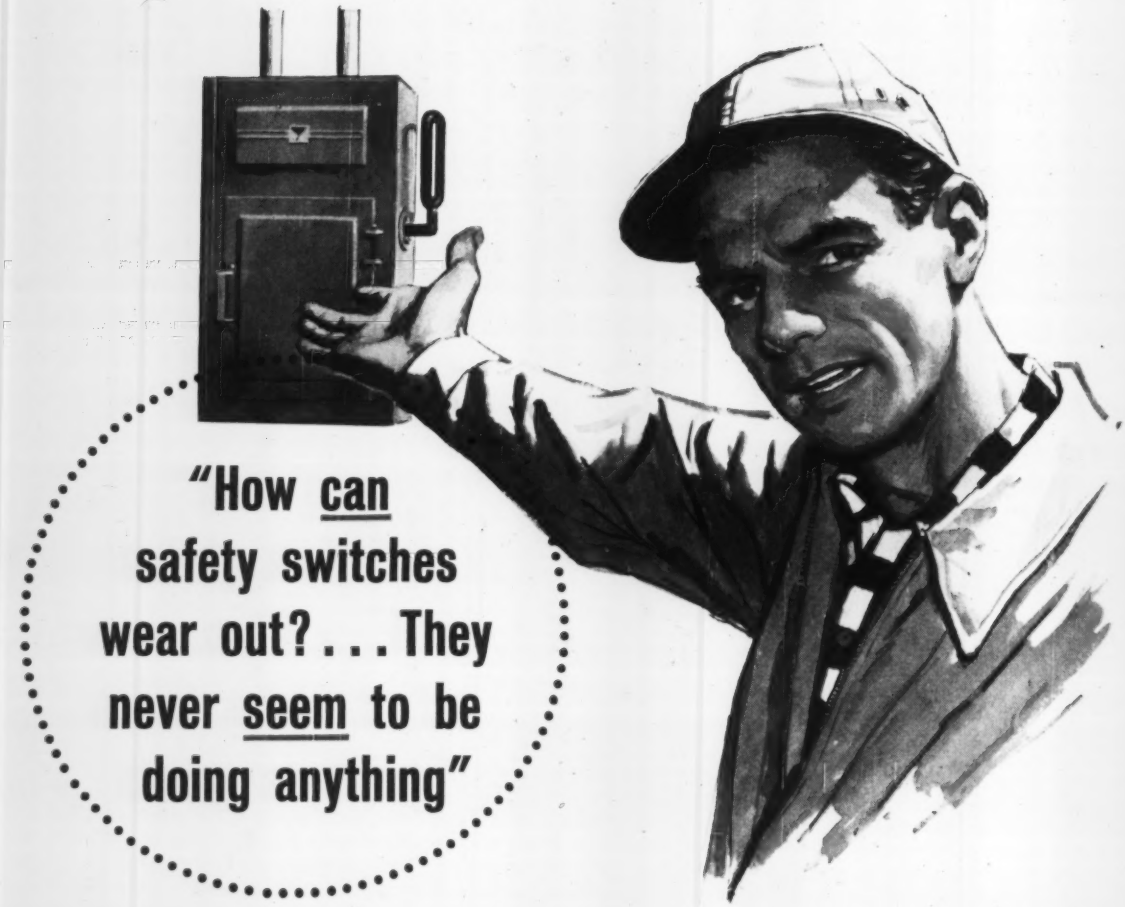
At Ingersoll-Rand Co., Painted Post, N.Y., blast cleaning loads weigh 2,000 lbs., include castings up to 300 lbs. each. To handle these loads efficiently, Ingersoll-Rand replaced its old blast cleaning barrel with a new Pangborn Rotoblast Barrel . . . and benefited *three* ways!

Cleaning quality is "incomparably better." Maintenance time and costs have been drastically cut. (For example, wheel vanes previously lasted 12 to 15 blast hours, now last 70 blast hours.) And cleaning time per load has been reduced from 12-15 minutes to only 7 minutes! Cleaning production now exceeds 10,000 lbs. per hour, cutting 7½-hour days to 3 and 4-hour days in the cleaning department.

For full details on how Pangborn Rotoblast can save you money, write: PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment —Rotoblast Steel Shot and Grit.*™

Pangborn

Cleans it fast with ROTOBLAST®

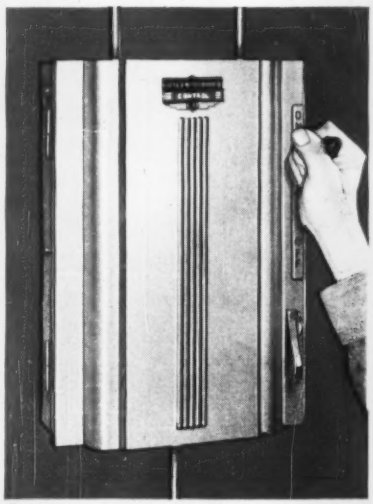


"How can safety switches wear out? . . . They never seem to be doing anything"

The fact that safety switches seem to be doing nothing at all until an emergency arises and somebody rushes to "pull the switch" is very deceptive. Actually, safety switches *work* every minute they are in service, fighting the ravages of unavoidable internal heating . . . and how well they are built decides how much *safety* your customer has when he really needs it.

Normal full-load current passing through the fuses in a safety switch generates considerable heat, temperatures as high as 700° F are not uncommon. This is not a criticism of fuses because they must operate close to their *melting* point at full load if they are to function properly when an overload occurs. But the continual heating of the switch mechanism in the confined enclosure creates a serious *heat* problem. Metal parts warp and corrode. Contacts loosen, then either weld or *burn up.*

Cutler-Hammer engineers tackled the problem of internal heating and licked it. Cutler-Hammer *Heat-Proof* Safety Switches use only selected heat resistive materials and a design that conducts away the trapped heat. Why settle for less when Cutler-Hammer *Heat-Proof* Safety Switches cost no more. Write today for your handy selection guide, C-H Merchandiser, Pub. EA100-R213. Cutler-Hammer Inc., Milwaukee 1, Wis.



Be sure your men and equipment are protected with *Heat-Proof* Cutler-Hammer Heavy Duty 4105 Safety Switches . . . choice of Mill Engineers everywhere.

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